



# THE MARINE REVIEW



VOL. 47

CLEVELAND

FEBRUARY, 1917

NEW YORK

No. 2

## How Lake Interests Set a Record

Nearly 15 Per Cent More Bulk Freight Was Handled on  
the Great Lakes Last Year, With Slightly More Capacity

LAST YEAR will stand forth in the annals of the Great Lakes as a year of almost continuous surprises. The vessel men, to all practical purposes, found sufficient bottoms to square with the unprecedented demand. The shippers were surprised as the navigation season drew near its close, to find that they were going to move about all the freight they had to transport. The lower lake docks surprised themselves, and all other lake interests as well, by furnishing splendid dispatch during the crucial period of the season. Supplementary surprises were found in the greater depths of water; the comparative freedom from serious delays through storms or accidents; the rapidly mounting operating expenses which robbed the long term contracts, made before the season opened, of much of their attractiveness; and the unusually long navigation season.

The ability of the wonderful lake fleet to meet and satisfy a demand far beyond its tested capacity was as great a surprise to the fleet operators as to the shippers. Few men, familiar with conditions on the Great Lakes, had the hardihood last spring to feel, let alone express, much optimism concerning the prospects of transferring between upper and lower lake ports, the immense tonnages of ore, grain and coal, that were piling up. It required not one, but four and five months of successively record-breaking freight movements to change pessimism to hope and then to confidence. The lake fleet was truly considered as the neck of the bottle, but the bottle proved to be the shape of a container for milk and not for champagne.

### *Everyone Had to Do Their Bit*

One element of 1916's record that was not a surprise was the huge tonnages of freight that awaited transportation. It was the successful transportation of this freight that occasioned surprise, not the volume of the freight. Last winter, fleet managers, freight shippers, dock operators, ship repair yards, railroad chiefs, tug owners, and, in fact, all the elements of the complex structure which has grown up about the

Great Lakes, knew that they must prepare for a season far surpassing any one in their history. The completed figures for the year's freight movement, published elsewhere in this issue, mutely testify to the adequacy of these preparations.

One of the first preliminary steps taken by the vessel interests was to secure a line upon the fleet's carrying capacity. An exhaustive study was made of the various lake fleets, involving the computation of the capacity and speed of every vessel, together with the probable number of trips each would make in a season. The physical condition of the fleet and the amount of time each steamer probably would be kept in the ore trade, was also determined.

### *Facing a Discouraging Outlook*

The results of this study were not encouraging. The estimates of the lake fleet's ore-carrying capacity, which were made as a result of this computation, showed a considerable variance. One fleet operator placed the total ore-carrying capacity at 57,000,000 tons, while other estimates ranged as low as 51,000,000 tons. Sentiment finally crystallized around 53,000,000 tons as the probable maximum ore tonnage which the fleet could handle. The blast furnaces dependent upon the Lake Superior district for their iron ore were operating at a pace that insured a consumption of nearly 57,000,000 tons of ore in 1916. With heavy tonnages of coal and grain awaiting transportation, and the ore movement apparently foredoomed to fall below the demand, the outlook was anything but promising.

The problem was attacked with characteristic vigor. During the enforced winter idleness, the boats were put in splendid condition and in some instances, vessels that had not operated for several seasons, were overhauled and made ready. Several unfavorable factors contributed to the general uneasiness felt as the open season approached. The heavy demand for labor from all parts of the country threatened to complicate the problem of securing sufficient crews to



man the full fleet when the ice-bound vessels were released. Added to this, the provision of the seamen's law, requiring that 40 per cent of the deck crew must carry certificates as able-bodied seamen, had just become operative. The shortage of these certificated "A. B.'s" was variously estimated at from 1,500 to 9,000 with a majority convinced that the shortage would range between 1,700 and 2,000 men.

The labor problem was solved satisfactorily by co-operation between the fleet operators and their employes, which made it certain that enough men would present themselves for examination to meet the requirements of the 40 per cent provision. Through advertisements and personal work by the older employes, enough men were secured to permit the full fleet to go into commission.

Natural obstacles were next attacked, ice-breakers being chartered by some of the larger fleet owners to break channels through the ice in the straits of Mackinac, St. Mary's river and into Escanaba. The opening was thus advanced by about two weeks. By keeping these ice crushers at work for days, the fleet was able to move 1,658,411 tons of ore in April, or nearly 100 per cent more than in any other April. The record-breaking habit once acquired became fixed. May established a new monthly record with 8,449,580 tons, and June followed with 9,507,576 tons, July with 9,750,157 tons, and August with 9,850,140 tons. The last month still holds the record, but the movements in September, October, November and December were easily ahead of the fleet's best previous efforts in corresponding months of earlier years.

The total ore movement for the season totaled 64,734,198 tons, an increase of 18,415,394 tons over 1915, and of 15,663,720 tons over the previous record set in 1913. The increase from 1915 to 1916 was greater than the complete season's movement in any year prior to 1900.

The secret of the fleet's success is found largely in the efficiency with which each branch concerned in lake freight transportation, did its share. The fleets

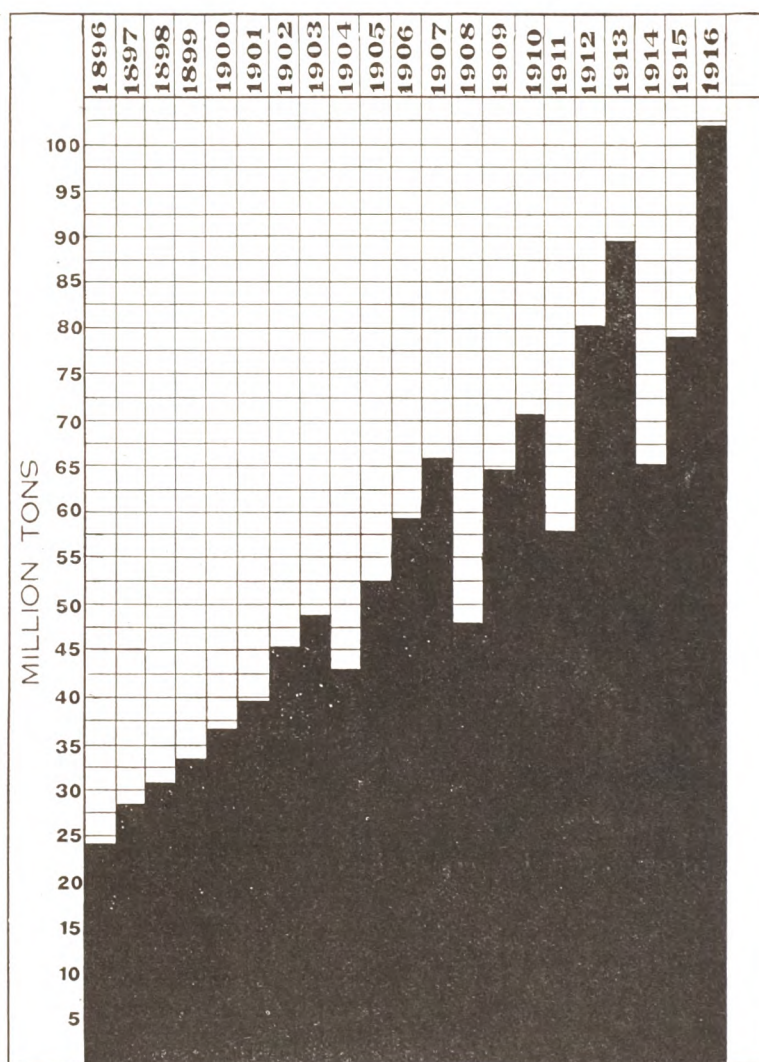
were excellently managed, dispatch at upper lake ports was good, and the railroads operating from lower lake docks furnished cars and motive power in abundance during the bulk of the season. Natural causes contributed also to the successful year. The recommended drafts for the connecting channels between the lakes were higher all year. The increase in the recommended drafts averaged about 5 inches, enough to add 400 tons to the carrying capacity of the big bulk freighters. Weather conditions were generally good and the time lost through bad weather, collisions, etc., was held at a minimum. Can the fleet this year

repeat its 1916 record? Many observers are confident that it can. They point out how effectually the fears felt last spring were dispelled, and expect to see the new tonnage built more than offset any delays arising this summer. On the other hand, some doubt is felt by other interests who predict that delays through poorer dispatch at lower lake ports due to the greater congestion now prevailing on the railroads. But whichever prophecy proves true, it is certain that the lake interests will tackle the new season's problems with the same efficiency that made last year's great record possible.

The chart published as a special insert with this issue, shows graphically the bulk freight movement on the Great Lakes for the past 21 years. The total movement in 1916 approximated 102,200,000 tons, exceeding by 14.4 per cent the previous record set in 1913. The chart shows the total shipments of iron

ore, together with the receipts at Lake Erie and Lake Michigan ports; the total movements of both bituminous and anthracite coal; and the grain shipments. *The Marine Review* is indebted to Charles E. Cole, superintendent of the C. & P. docks at Cleveland, for the original chart from which this insert was made.

The index to *The Marine Review* for the year 1916, Vol. 46, has just been completed. It will be found valuable in quickly finding any article published during the year. Copies of the index will be mailed free to subscribers on request.



BULK FREIGHT MOVEMENT ON THE GREAT LAKES

This graphic presentation of the total movement of iron ore, coal and grain on the Great Lakes for the past 21 years shows clearly the consistent growth of lake trade. The chart is based on statistics shown on the large insert, presented with this issue.



# Shipping Board Strips for Action

Five Men Appointed by President Face Big Problems—What Will They Do With That \$50,000,000?—Will Merchant Marine Prosper?

By L. W. Moffett

THE personnel of the shipping board announced on Dec. 22 by President Wilson created a surprise in marine circles. Aside from Bernard N. Baker, of Baltimore, who may be made chairman of the organization, there was no general knowledge as to who would constitute its membership. Mr. Baker's appointment was anticipated. Incidentally, he is the only member of the board who is widely known by the shipping interests of the country. Like Mr. Baker, however, the other members have been strongly recommended by the administration as being men who are well qualified for the important tasks they are to perform.

The members of the board named by the President are: William Denman, Democrat, San Francisco, six-year term; Bernard N. Baker, Democrat, Baltimore, five-year term; John A. Donald, Democrat, New York City, four-year term; James B. White, Republican, Kansas City, three-year term; Theodore Brent, Progressive Republican, New Orleans, two-year term.

## Statement From White House

In announcing the names of the members of the board, the White House issued the following statement giving a sketch of the life of each:

"Mr. Denman is a lawyer of San Francisco, having had extensive ex-

## Great Lakes Ignored

*Shipping interests all over the country are still wondering why the Great Lakes district was not given representation on the shipping board. Out of a total documented tonnage under the American flag of 8,389,429, 2,818,009 tons are on the Great Lakes. Surely the needs of this great fleet are entitled to serious consideration at the hands of the board. The question even may be raised as to whether the provisions of the law have been faithfully carried out in the appointments as announced. The law states very clearly that "the commissioners shall be appointed with due regard to a fair representation of the geographical divisions of the country." Does the ignoring of the district containing a third of the American merchant marine fulfill this provision? We leave it to you.*

perience in admiralty cases. He is interested in the question of an American merchant marine and is familiar with this pressing problem. He was born in San Francisco Nov. 7, 1872; graduated from the University of California in 1894, and from the Harvard law school in 1897. Since his admission to the bar of California in 1898 he has been engaged in general practice, including many maritime cases. He is a member of the firm of Denman & Arnold. Mr. Denman was as-

sistant professor of law and lecturer at Hastings College of Law and University of California from 1902-06. He was chairman of the committee appointed by the mayor of San Francisco to report on the causes of municipal corruption in San Francisco, 1908-10 and drafted the report of that commission. In 1908 he organized a state-wide movement in California for the non-partisan election of judges and also drafted the non-partisan majority election law, which is now part of the San Francisco charter.

## Mr. Baker's Qualifications

"Mr. Baker has had wide experience as a ship owner and operator, and in addition is a student of the merchant marine question. For 30 years Mr. Baker was president of the Atlantic Transport Line, which he organized and operated and in which he held a controlling interest. He was formerly president of the Baltimore Trust & Guaranty Co., and is a director of many commercial enterprises. He is a trustee of the Johns Hopkins University; chairman of the Maryland conservation commission, and member of the national joint commission on conservation. Mr. Baker was born in Baltimore, May 11, 1854, and was educated at the Sheffield Scientific School, Yale.

"Mr. Donald has had a life-long experience in the steamship business and

## International Complications Await Shipping Board

WHEN the new shipping board finally gets down to business, it will find itself launched on a tempestuous sea. If it ever survives the storms of 1917 and starts to do business with its dinky \$50,000,000 government-owned merchant marine, it may find the doors of international commerce shut tight in its face. Russia already has partially closed the gateway by her action in peremptorily refusing to renew our commercial treaty. This treaty, it will be recalled, was abrogated during the Taft administration because of Russia's refusal to admit naturalized Jews to the czar's realm. Now Russia, owing to her obligations to her allies, coupled probably with some natural resentment, politely informs us she doesn't care about a treaty at all. Our merchants, she infers, may go hang.

If this treaty were the only one hanging in

the balance it wouldn't be so bad. As a matter of fact, there are 21 more that have been more or less mutilated to conform with the provisions of that prize legislative botch, the seamen's act.

It is not beyond the bounds of possibility that the shipping board may be told to tow its little fleet home, unless we want to reinstate the treaty provisions we have so thoughtlessly trampled in the dust.

These provisions have to do with the arrest of deserting seamen, the allotment of wages, and other agreements for the enforcement of maritime contracts. Vigorous objections already have been lodged by Great Britain, Spain, Italy, Austria, Holland and other European governments. Our government-owned ships may easily become enmeshed in this net of international complication.

is conversant with the ocean transportation problem of the United States. He was born in Glasgow, Scotland, in 1857, and became a citizen of the United States in 1890, 26 years ago. As a young man he spent four years with one of the leading ship brokers in Glasgow and afterwards was employed by the steamship firm of Walker, Donald & Co., of which his brother was a partner. After leaving that company, Mr. Donald came to the United States and arranged to start business in this country on his own account, entering into the supply business for dry docking and painting ships. In 1898 he began business as a ship owner and engaged in the West Indian fruit trade. In 1902, he formed the Donald Steamship Co., under the laws of New York, which took over the steamers owned by Mr. Donald and began the building of others. Eight ships built by Mr. Donald were acquired by the company. He is chairman of the board of education of Staten Island; president and director in the Holzapfel's Composition Co., the William Cail Bitmo Co., the Donald Agency, Inc., the Donald Steamship Co., and the Holsam Co. He is also director and member of the executive committee of the Atlantic Fruit Co.

#### Familiar with Exporting

"Mr. White is a well known lumberman of Kansas City, Mo., and has gained wide knowledge of the ocean transportation problem of the United States through his experience as an exporter. He is equipped for service on the board by the training of an exceedingly active and extensive business career. As a young man, Mr. White entered the lumber manufacturing business in Youngsville, Pa., and East Brady, Pa., under the firm name of White & Kinnear, and in 1879 removed to Missouri where he continued in the lumber business and where he has been identified with many business enterprises. He is president of the Missouri Lumber & Mining Co., the Louisiana Central Lumber Co., the Forest Lumber Co., and an officer or director of many other concerns. He is especially well informed on the export business of the country. He has been actively identified with the movement for the conservation of our natural resources, having served as a member of the forestry department on the commission on conservation of natural resources; as a member of the state board of forestry of Missouri; as a delegate to the first national conservation congress held in Seattle in 1909; and as a delegate to the southern conservation congress

held in New Orleans in the same year. He was chairman of the executive committee of the first, second and third congresses for the conservation of natural resources, and was elected president at a meeting in Kansas City in 1911. Mr. White organized the

### From a Union Stand-point

*In an interview given out in New York, Arthur N. McGray, secretary-representative of the Neptune Association of Licensed Masters and Mates of Ocean and Coastwise Steam Vessels, expresses dissatisfaction with the appointments to the federal shipping board.*

*"In scanning the names nominated for confirmation by the senate," said Mr. McGray, "we are simply amazed. We had not expected, nor had we imagined, that the President would select a representative on this commission from the ranks of organized labor. We did expect, however, to find on that commission at least one representative of American shipping. Instead, what do we find? An admiralty lawyer from San Francisco, Mr. Denman, a democrat, is given the long term of six years. Mr. Baker, of Baltimore, a democrat, an ex-president of the Atlantic Transport Line, a British steamship company operating under the British flag, is given the five-year term; Mr. Donald, of New York, a democrat, now president of the Donald Line, another British steamship company, operating under the British flag, is given the four-year term; Mr. White, of Kansas City, Mo., a lumber merchant, a republican, is given the three-year term, and Mr. Brent, of New Orleans, a republican and a railroad official, is given the two-year term.*

*"The steamers of the Donald Line, with the exception of the British licensed officers, are manned exclusively by Chinese in the deck, engine, steward and cook departments, even the petty officers being Chinamen. Are we justified in expecting that the only two members of this commission having any steamship experience, whose whole environment has been British, can fulfill the purposes of the act? If Mr. Donald is interested in the development of our merchant marine, why has he as a patriotic American citizen, failed to avail himself of the act of Aug. 18, 1914, which permitted him to transfer his foreign-built ships to the American flag?"*

first lumber manufacturing association in the southern states in 1882 (Yellow Pine Lumber Manufacturers' Association) and was its first president. He is a director of the Yellow Pine Lumber Manufacturers' Association, and is a member of the board of governors of the National Lumber Manufacturers' Association. Mr. White was born in Chautauqua county, New York, Dec. 8, 1847, and received a

public school and academy education in that state.

"Mr. Brent is 42 years of age and was born at Muscatine, Ia. He has had a public school education. He has had a lengthy experience in railroad matters and was connected with the Rock Island-Frisco Line between 1906 and 1910 as assistant to the vice president. In that time he had a rather prominent share in reshaping the traffic policy of those lines in bringing their operations in harmony with the new law. He also had responsibility, under the vice president, for framing the rate adjustments, as those lines were members of every traffic association in the United States save one, this work giving him a national viewpoint. The work brought him in contact with lake and coastwise shipping throughout the country. He also has had charge of the traffic affairs of the terminal lines of the Union Stock Yards, namely, the Chicago Junction and Chicago River & Indiana railroad, and was general manager of the Chicago Lighterage Co. He had experience in handling a coal property and developing the mine into profitable operation. He has made a study of shipping and shipping conditions, and is conversant with and in sympathy with the present law."

#### May be Objections

Until the senate takes up the consideration of the appointments, by hearings or in committee, it is not known whether there will be any opposition to confirming any of the men named by the President. It has been reported that Mr. Baker and Mr. Brent will be opposed, if no others are, but it is impossible to say at this time how well founded the report is. There is said to be two opposing views entertained in the senate with regard to Mr. Baker. One faction is said to take the position that, despite his practical experience as a steamship man, he entertains dangerous opinions as to the manner in which a merchant marine should be built up. Another faction appears to be of the opinion that he is in favor of the creation of shipping pools, combines, etc., and that such an attitude would offer grounds for objecting to his confirmation.

Mr. Brent, it has been said, may be opposed by the regular Republicans, because of his so-called progressive ideas. It has also been reported that he was not entirely acceptable to southern members of congress, but this report apparently lacks justification in view of the fact that he was warmly supported by members of



congress, not only from Louisiana, but also from nearby states. He was also indorsed by trade organizations in New Orleans, after other candidates had been considered and declined to accept a position on the board.

Mr. Brent does not profess to be an expert on marine matters. He is familiar with related questions, it is claimed, which will be of service to the board and probably will have a great deal to do by way of advising the board as to the making of rates, rules and regulations in accordance with the powers conferred upon the board. It is assumed also that he will have considerable to do with regard to the policy governing the traffic on the Great Lakes and along the coast because of his acquaintance with this traffic acquired when he was connected with the Rock Island-Frisco lines.

#### May Get to Work This Winter

The shipping board will take up its duties as soon as it has been confirmed by the senate. It is an experimental organization and has vast powers conferred upon it by the act creating it. In addition, conditions in the overseas trade growing out of the war present complexities that will have to be faced. How the board will dispose of these questions will have to be determined upon after it has been organized and has studied the problems before it.

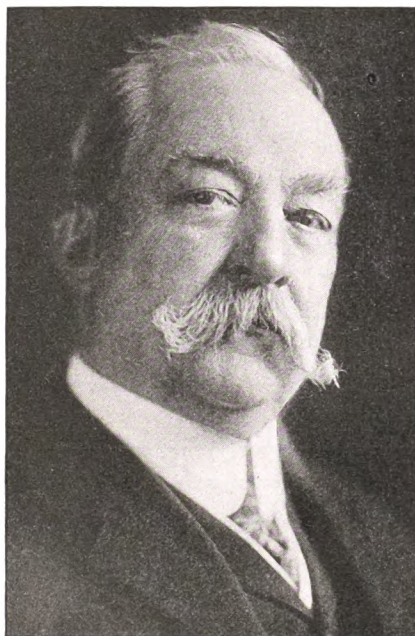
While the board is authorized, with the approval of the President, to build and equip vessels for the merchant marine, or to purchase, lease or charter them, it has to do so through a corporation, capitalized at \$50,000,000, in which the government must hold all or a majority of the stock. It



THEODORE BRENT

cannot secure ships now engaged in commerce carrying, or belonging to any belligerent nation, or not suitable, after reasonable alterations, for auxiliary naval or military use. Moreover, the ship yards are congested with private and government work, the navy yards are also crowded with work, and it seems obvious that the board could not build vessels before foreign owned merchant lines had resumed their normal trade. These facts have led to the belief that the board will not take up at once, if at all, the matter of building or operating a merchant marine, but that instead it will study navigation laws in the United States and European laws with a view to adopting a plan of building up a merchant marine along constructive lines.

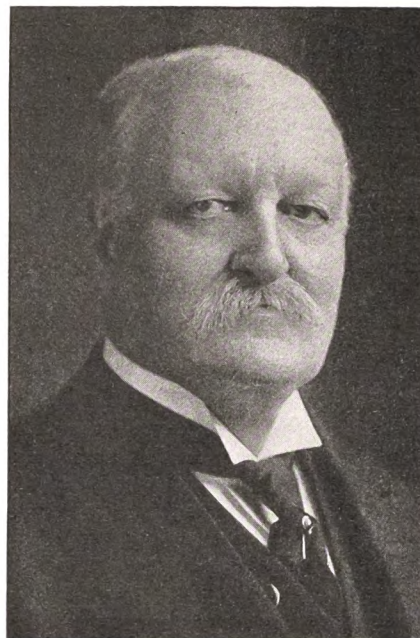
How broad the scope of the board



BERNARD N. BAKER

may become is a question that can be determined only with the passing of time and the practical application of its powers. While those powers are already broad, it is claimed in some well informed circles that they will assume much greater proportions, and that, in this connection, the board will eventually take over the work of the bureau of navigation and the steamboat inspection service, both of which are now under the jurisdiction of the department of commerce.

One of the first things which the board will do in the way of studying navigation laws, it is said, is to make a visit to England in person, or through experts, and confer with the board of trade there to get ideas. The opinion has been expressed, however, that any ideas secured in this



JAMES B. WHITE

manner should be thoroughly Americanized; the board should plan to build up a merchant marine purely along American lines, and to make it entirely independent of foreign influences. The American Bureau of Shipping, it has been pointed out, should be given increased importance and better provision should be made for the classification of American ships, with insurance risks on them taken by American interests.

Shortly before he was named as a member of the board, Theodore Brent, of New Orleans, gave his views as to problems which the new body will have to work out, touching particularly upon its powers of rate-making.

#### Division of Authority

"The shipping board is going to be faced with the immediate need of some definition of the division of authority between it and the interstate commerce commission as concerns the regulation of both the coastwise and lake traffic," said Mr. Brent. "There are cases pending before the commission now under the Panama canal amendments to the Hepburn law in which the commission is urged to take jurisdiction of the strictly port to port rates of coastwise lines owned by railroad corporations.

"These carriers tell the commission it has no jurisdiction. If this is true, then it must lodge in the shipping board and there is immediate need of an agreement between the two bodies so that in lieu of a better plan, joint records may be made in such cases for both the board and commission. The port to port jurisdiction logically rests with the shipping board, because, while the commission



might take jurisdiction of the rates of the Morgan Line, for example, it clearly has no jurisdiction over the strictly water rates of the Mallory Line, the Morgan's competitor.

"Unless some clear agreement is reached at once, we will drift into the same complexities as have for years been painfully present in the conflict between the state and interstate authority. The board cannot shirk the duty clearly lodged with it to take regulation of these matters, both coastwise and by lake, but it will necessarily want to minimize the points of conflict with the commission.

"There has got to be some immediate thought on the part of the board for the protection of coastwise shipping from the aggression of rail carriers. The vast majority of the coastwise lines have been brought under railroad ownership or control as a protective measure. This was inevitable under existing law. Without some protection from their rail competitors they would have died.

#### Long and Short Haul Principle

"One of the first things the shipping board will have forced upon it, as soon as the transcontinental shipping is resumed through the Panama canal, will be the necessity, by friendly conference, if possible, of defining some very clear limitations of the exercise, given by the law to the commission, of the right to relieve the railroads of compliance with the long-and-short-haul principle in 'meeting water competition'. The commission has permitted the Southern Pacific to meet water competition and to carry heavy commodities from San Francisco to the Atlantic ports for 40 cents per 100 pounds, while charging 75 and 86 cents to nearer points intermediate.

"The Southern Pacific said it had felt the water competition at Boston, New York, Baltimore, Philadelphia and Charleston and the permission was granted to make the low rates to those cities. It said it had not felt the competition at Galveston, Mobile, New Orleans, Jacksonville or Savannah, and the high rates still exist by rail to these intermediate southern cities, whose merchants have had to see their business in these commodities slip away from them.

"What steamship line would pioneer a service to any of these southern ports in the face of the certain knowledge that its trade would immediately be absorbed by the railroads meeting its rates? Yet the service is as imperative to these as to the Atlantic ports, and under normal conditions we would probably

have seen it established. The attitude of the transcontinental rail lines has just been boldly stated to the commission."

Mr. Brent quoted suggestions made by the transcontinental rail lines to the interstate commerce commission and said they simply mean the roads demand the unrestricted right to make rates which shall insure them against a resumption of water service through the canal.

#### Why They Don't Compete

"Is it any wonder that our coastwise steamship lines only run as connections, not as competitors of the railroads?" Mr. Brent asked. "How can the shipping board escape the necessity of working for a modifica-

#### Yates Will Help

*Secretary of Commerce Redfield has assigned Captain Charles C. Yates, of the coast and geodetic survey, to assist in preliminary organization of the new shipping board. Captain Yates has assisted in outlining an organization plan and his whole time will be given to the work. Captain Yates comes from Cleveland and is said to be thoroughly versed regarding transportation problems on the Great Lakes. It is hoped that his appointment will recompense in a measure for the failure of the President to name a representative from the Great Lakes region as a member of the board.*

tion of this principle of permanent right, the moment the Graces, or Luckenbachs or the Dearborns or Captain Dollar attempt to resume their service through the canal?

"The question will be forced to the attention of the board immediately on the Great Lakes, where conditions are ripe for the carriers independent of the railroads, the commission having required the railroads to part with their lake lines."

Referring to the needs of the gulf coast, Mr. Brent said that perhaps its most pressing need is service to South America. For years, he said, there has been an agreement between the conference lines and coffee importers to make the same rates from the coffee ports of Brazil to New York and New Orleans. This, it was added, has been abrogated, and the coffee trade was divided evenly between the two ports. But, Mr. Brent asserted, neither the Lamport & Holt nor the Prince line would give southbound service from the gulf.

"Until the Steel Corporation began to send its boats to South American ports and the war disrupted ordinary

shipping, these lines would not give a southbound service from any American port. They insisted on three leg trips, the outward being always from England, with British merchandise. War conditions changed this arbitrary program somewhat. All Lamport & Holt boats have been withdrawn from the gulf service. Those which have not been commandeered are running on a straight two leg course between New York and Argentina.

"The Brazilian Lloyds have followed with exclusive southbound service from New York, and now the Companio Commercial y Navigacao have been sending a part of their fleet to this country, keeping the coffee moving. All these lines say they must go to New York for return cargo. This is not true, in any real sense. At the present time it is easier to go to New York for return cargo, because there is no southbound service from the gulf. Necessarily, therefore, all exportations are being directed to New York and the steamship men say they must go where the freight is tendered to them."

#### Building Six Big Ships

The American Ship Building Co., Cleveland, is building six big bulk freighters for delivery this year. Five of these vessels are for the Lake Superior iron ore trade while the sixth will carry limestone.

The first of the six to be launched will be the steamer EUGENE W. PARGNY, which will enter the water at Lorain, O., on Jan. 20. The vessel is ready now for the launching, but the date was advanced two weeks in order to permit the launching party to be assembled. This will be the first January launching of a bulk freighter in a number of years. The big freighter is named in honor of the president of the American Sheet & Tin Plate Co., and is being built for the Pittsburgh Steamship Co. She is 600 feet long, 60 foot beam and 32 feet deep. She will be delivered in April.

The other bulk freighters now under construction at the Lorain yard are the steamers CARL D. BRADLEY and AUGUST ZIESING. The former is practically a duplicate of the self-unloader W. F. WHITE. The latter is being built for the Pittsburgh Steamship Co., and is a duplicate of PARGNY. CARL D. BRADLEY will be equipped with electrical equipment for operating the unloading machinery. Both of these ships will be delivered in May.

The three other bulk freighters now under order will be built for M. A. Hanna & Co. They are 545 feet in length. They will be delivered during the summer of 1917.



# Don't Dodge Publicity--Court It

To Transform Sudden Prosperity Into Permanent Success, American Ship Builders Must Enlist Public Co-operation—Close Corporations Archaic

By Guy F. Creveling

YESTERDAY the American ship building industry was poverty stricken; today it is prosperous. The war has rejuvenated the industry financially. Millions of dollars are pouring into the coffers of companies that two years ago were tottering at the brink of bankruptcy. New companies have sprung up and already have enough orders on their books to keep them busy two years or more. There seems to be enough business in sight to keep the ship building capacity of the world busy for five years. The tap-tap of the riveter is heard in all the steel ship yards of the coast and on the Great Lakes. The yards of New England, which long ago resounded with the thump of hammer and caulking iron as the famous clipper ships of the past were molded into magnificence, have been rehabilitated and now are busily turning out smart auxiliary schooners. Ghosts of ships, long left to decay at their anchorages, have been resurrected, rebuilt and sent once more to ply the ocean's highways. Yet the cry from all the world is for ships and still more ships.

Important as this demand is from the standpoint of ship builders, it is seconded closely by the fact that the necessity for an American merchant marine is being pressed home to the American public. The nation, as with one voice, asks how American shipping can be restored. All American shippers are seeking freedom from foreign ship owners, whose sympathies naturally are with the merchants of their own land. The Iowa farmer, the Ohio pig iron maker, the Louisiana planter and the Montana miner have learned, to their cost, the need for a merchant marine.

It is essential to the United States ship building industry that this country's shipping be restored to its rightful eminence. Orders for ships may be plentiful for several years after the close of the war, but eventually the industry will fall back into its pre-war condition of dry-rot unless American shipping thrives. Now, when public interest is awakened, is the time to lay the foundations for the future. The reasons for the decline in American shipping and ship building are well understood in the trade. Lack of governmental co-

operation, high costs rendering competition with foreign countries difficult, and impossible labor laws have combined to drive the flag almost from the seas.

Public opinion has permitted this, owing to lack of knowledge of the facts. American business men are

## Will Tax Capacity

*In announcing the formation of a new company a short time ago, to take over the plants and properties of the New York Ship Building Co. officials pointed to the need for ships for the American merchant marine and predicted a rapid growth in this important means of promoting foreign trade.*

*"Ship building prospects in America were never better," said the statement. "The demand for ships is unprecedented. Labor costs abroad are almost on a par with those here and such legal restrictions have been placed by all foreign maritime countries upon the sale or transfer of ships from one flag to another that although it is impossible to purchase ships abroad, foreigners are practically free to buy here. Hence the demand to make up the shortage of the world as well as to supply the rapidly growing American merchant marine falls largely upon American ship yards.*

*"It is estimated that the tonnage of the world cannot be brought back to its normal position with regard to world requirements until 1922 at the earliest. This estimate is predicated on the war coming to an end in 1918 and upon the ship building capacity of the world being largely increased to meet the emergency."*

just beginning to appreciate the importance of public opinion. They are beginning to realize the necessity of taking the people into their confidence and acquainting them with their achievements and their problems. In years past business men have seen fit to conduct their affairs in their own way with the belief that as long as they remained within the law what they did was no one else's business. But a new policy is coming into being. The demagogue and the impractical reformer too long have appealed to the public's emotions through the yellow press. They have wielded too much influence and have been too big a factor in the halls of congress itself.

The public, as a whole, is eminently just when it sees both sides of an argument, but it has not been given all the facts. Business men are calling for a square deal, yet they themselves are partly to blame for not having received it long since. Now the railroads have undertaken an extensive campaign of education through the newspapers. Some of the big steel and industrial companies have taken similar measures. Certain of the large banks regularly issue bulletins containing information on current affairs intended to educate the public in economics.

But the ship building industry in general is years behind the times. Many leading ship builders operate close corporations. They have not adopted the modern policy of taking the public into their confidence. Their affairs are matters of mystery to be guarded as jealously as their honor. Only a comparatively few companies have adopted up-to-date methods even to the extent of publishing statements of their earnings. Is it surprising that when legislation of vital importance to ship builders is proposed in congress that the interests of the industry fall an easy prey to professional muckrakers?

Here are a few instances to show what ship building companies are accomplishing (these being among the few companies which gave out figures):

The New York Ship Building Co. earned \$1,334,432 in the 12 months ended Aug. 31, 1916; this sum is equal to 28.05 per cent on the company's \$4,756,200 capital stock. In addition, the company expended \$650,000—equal to 13.67 per cent on the stock—for plant improvements. The company now has about \$23,000,000 worth of business on its books, including awards recently made by the United States government for battleships; its working capital, amounting to about \$3,500,000, is more than sufficient to carry on this work.

William Cramp & Sons Ship & Engine Building Co. closed its last fiscal year April 30, 1916, since which time no official figures have been issued. During that year, profits amounted to \$1,497,254, or 17.68 per cent on the \$6,098,000 capital stock. On this basis, earnings equal to 25 per cent for the



same stock are estimated for this year. In the fiscal year ended April 30, 1915, the company earned 10.6 per cent; in 1914, 13.9 per cent; in 1913, 5 per cent; and in 1912, 3.4 per cent. On April 30, 1912, the net assets of the Cramp company, applicable to the common stock, were estimated at \$194 a share. The only outstanding fixed charge was an item of \$75,000 annual interest on an issue of \$1,500,000 one year 5 per cent notes placed as a temporary financing step to take care of the company's requirements for handling the large volume of new business. The company has so improved its equipment that it has greatly reduced its cost of production. Important changes were made recently in the interests owning the Cramp company and it is believed

the best in the history of the company. These few ship builders are representative of the industry as a whole. Practically all companies could tell a similar tale of remunerative activity—if they would. Investors have not altogether overlooked their opportunities. Capital amounting to about \$93,000,000 has been taken from private pockets and put into shipping or ship building enterprises since the war began.

The American International Corporation is a war-born enterprise which has come to play a prominent part in American shipping affairs. This company launched by big business men affiliated with the National City Bank of New York, was formed primarily to build up American foreign trade, with the financing of foreign customers a chief object. But the company immediately encountered the problem of transportation. Of what use were foreign orders if the goods could not be shipped? So the American International Corporation, with affiliated interests, acquired control of the International Mercantile Marine Co., and also of the Pacific Mail Co., the latter being on the verge of dissolution. Then, with the characteristic thoroughness of big business, the American International stepped in and bought the New York Ship Building Co. outright, expressing intention to increase its capacity 25 to 50 per cent.

Other ship yards have passed to the control of powerful interests. Perhaps the most powerful group is that owned by the Bethlehem Steel Corporation. As a ship builder, this company has attained complete integration, controlling almost the entire process of production from mining iron ore to fitting out the completed ship. Bethlehem owns the Fore River Ship Building Corporation, the Union Iron Works, the Maryland Steel Co. and the Harlan & Hollingsworth plant. It has yards both on the Atlantic and on the Pacific coasts. These yards, on Oct. 1, 1916, had under contract 68 steel merchant ships of over 400,000 gross tons. At present Bethlehem is understood to be conducting experiments at Sparrows Point, Md., in standardizing ship building. The Bethlehem organization is so well oiled a machine that it is expected to be a most important element in after-war competition. Government officials at Washington assert that Bethlehem's operations are typical of the change that is coming over American ship building.

This is true to a certain extent. Unhappily, all ship builders do not own their own ore mines, blast furnaces, steel works and other links in

the manufacturing process, as Bethlehem does. But the profits from the war time business are enabling all companies to modernize their mechanical equipment to the last degree and to build up cash balances which will stand in good stead in future competition.

It is believed that this competition, when it does develop, will be as severe as any ever witnessed in any industry. For years the United Kingdom has led the world in ship building. British makers have attained highest efficiency through standardization of types and sizes of vessels, thereby increasing their production. There has been excellent co-operation between British steelmakers and ship yards. But the basis of England's supremacy has been her advantage

### Fabulous Profits

*A vessel recently was sold for 200 times her value several years ago. As a shipping investment the deal represents the largest profit made during the war.*

*A few years ago a British steamer, which had stranded on the South American coast, was sold, as she lay, to neutrals for 1,500 pounds (about \$7,500). The purchasers had her refloated and repaired, and employed her in trade. She has now been resold for 320,000 pounds (about \$1,600,000), being 200 times the price paid for her as a wreck.*

*This price takes no account of the cost of salvaging and repairing the ship, but presumably these expenses would have been amply covered by her earnings since she was salvaged, including two years of extremely high freights. The present price merely represents the current value of tonnage.*

that this company may figure in a merger before long.

The American Ship Building Co., which makes a specialty of building bulk freighters for the Great Lakes iron ore carrying trade, although it now has contracts for many ocean going vessels, some time ago made public its report for the fiscal year ended June 30, 1916. Its net profits during that year were modest, amounting to \$579,307, as the company completed only four boats with a total carrying capacity of 37,000 gross tons. If the full 7 per cent dividends had been paid on the \$7,900,000 preferred stock, only a fraction of 1 per cent would have remained for the \$7,600,000 common shares. But the American Ship Building Co. entered its new fiscal year with a flying start, for it had 33 boats under contract with a total carrying capacity of 174,000 gross tons. The current fiscal year will be by far

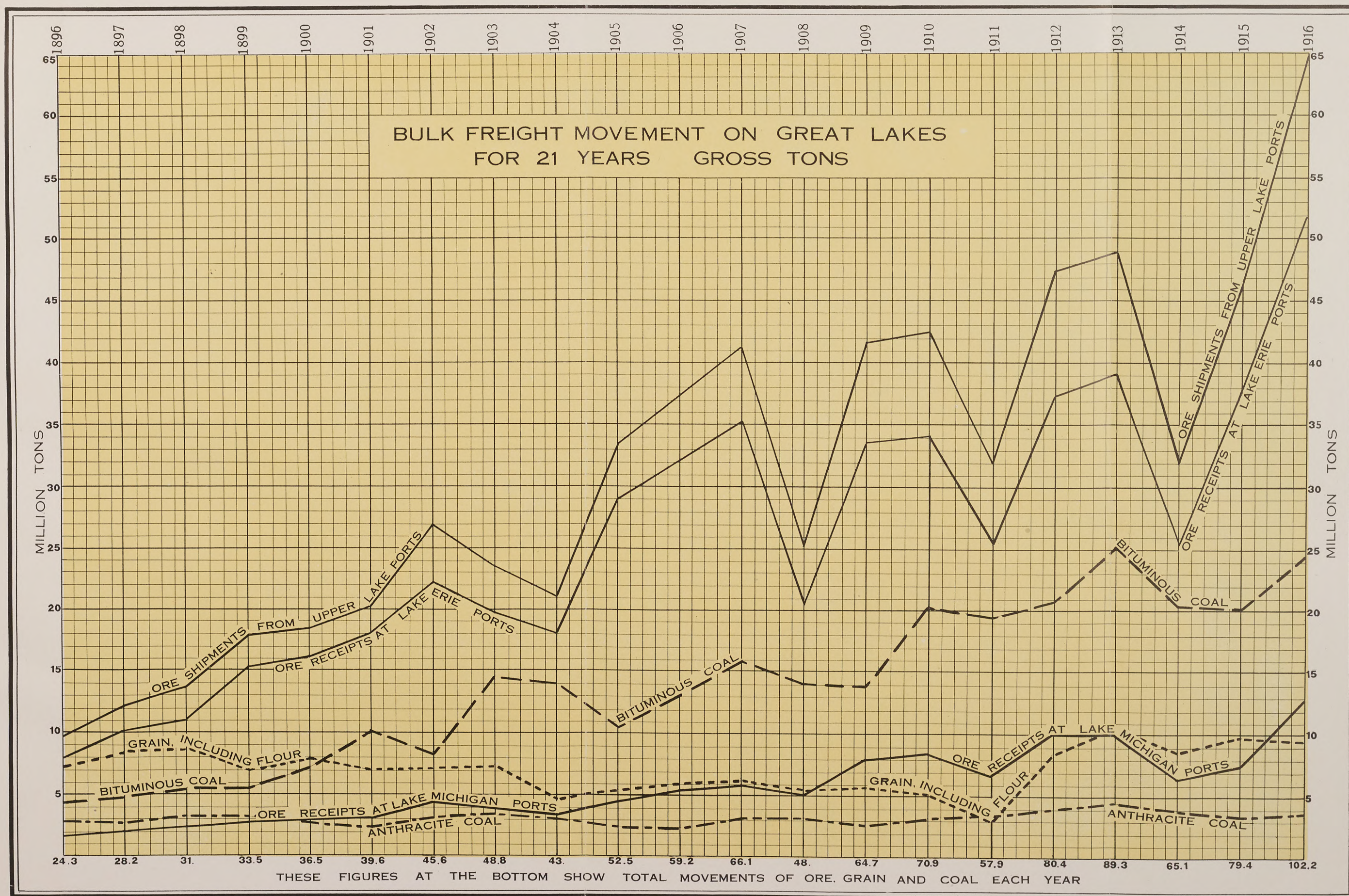
### Lake Freight Movement Shown Graphically

*The two-color chart inserted opposite this page shows graphically the total bulk freight movement on the Great Lakes for the past 21 years. As revealed by the top line, the total movement has grown from 24,300,000 tons in 1896 to 102,200,000 tons in 1916, an increase of 321 per cent. The Marine Review expects to make this graphic record of the bulk-freight movement on the Great Lakes, an annual feature of its annual ship building number. The chart is especially adapted for framing. The size of the chart will remain unchanged from year to year. Unfolded copies of the chart will be furnished free to subscribers on application. For the data from which this chart was compiled, The Marine Review is indebted to Charles E. Cole, superintendent of the C. & P. dock at Cleveland.*

in the matter of wages. As the Newport News Ship Building & Dry Dock Co. at one time pointed out, American wages were from 50 to 100 per cent above British wages before the war. It is impossible to predict what the labor situation in Europe will be after the war, but it is hardly likely that British wages will approximate American wages. But from the standpoint of materials, America will be fairly matched with her foreign competitors. Ever since August, 1910, ship plates have been as cheap—or as dear—in the United States as in England. In July, 1914, the Pittsburgh price was \$25.09, and the Middlesbrough price \$29.20 a ton. Present prices are treble these figures but they are as high abroad as they are here. With labor costs more fairly balanced and materials on an equitable basis, it would seem that United States ship builders have a chance to win out in equal



# THE MARINE REVIEW





sam  
 In  
 1915  
 cent  
 5 pe  
 On  
 of t  
 the  
 at \$  
 ing  
 000  
 \$1,50  
 plac  
 to t  
 men  
 of r  
 so i  
 grea  
 tion  
 rece  
 Crai

ti  
 A  
 re  
 di

er  
 S  
 sh  
 (c  
 he  
 pl  
 be  
 (c  
 th

th  
 th  
 pe  
 er  
 sa  
 tr  
 pr  
 ve

that  
 mer  
 T  
 whic  
 bulk  
 iron  
 it n  
 goir  
 publi  
 ende  
 duri  
 amo  
 pan  
 a t  
 gros  
 divi  
 900,0  
 tion  
 mair  
 shar  
 ing  
 with  
 unde  
 capa  
 curr



competition, especially taking "Yankee genius" into account.

But there is one more factor to be considered. This factor is the relation that foreign governments will bear to their national industries. All the signs point to a constantly growing co-operation between these two interests, whereas governmental co-operation in this country has gone but little past the talking point. If foreign ship builders are to receive financial assistance from their governments in the form of bounties, subventions, subsidies or under some other name, then American ship builders will labor under unfair disadvantages.

In this connection particularly will be noted the value of favorable public opinion. It remains for the ship builders to cultivate this public opinion and to educate the people so that they will understand it is to their own interest to give the American industry all the assistance in their power, at the polls and elsewhere.

#### Interest the Investor

Investors should be interested. A man who has a dollar in an enterprise is a staunch supporter of that enterprise. Ship building securities are not widely enough distributed. A ship builder reading these lines may suggest that his company is a close corporation, that its securities are not sold in the open market. But it is to his interest to make the man with capital want to buy his company's securities. Some time he may want that new capital, for few companies can expand indefinitely out of their own earnings and dull years are bound to come.

Now is the time to attract favorable interest to the ship building industry. Its business is big and its prospects are favorable. Why should ship builders hide the light of their success under a bushel? They are serving their country as few other business men are in this time of need for shipping. Even though a company's competitors do know what that company earned last year or what it may earn this year, they have gained no advantage. The American International Corporation and the Bethlehem Steel Corporation have learned that favorable public opinion is a most excellent thing and they are grasping every opportunity to mold it. Why should not all companies, as a first step at least, adopt the modern policy of making public their annual reports?

The Coastwise Ship Building Co., Locust Point, Md., has closed contracts with the Reading Co. for 10 barges

# Lloyds Names Committee

## Members of Committee to Direct Affairs in This Country Are Appointed

**T**HE American committee, formed to direct the affairs of Lloyds Register of Shipping in America, has been appointed as follows: Alfred Gilbert Smith, chairman; Herbert Appleton, deputy chairman.

#### Members in New York

Herbert Appleton, of Appleton & Cox (United States Lloyds), New York.

M. Bouvier, vice president, W. R. Grace & Co., New York.

Archibald H. Bull, president, A. H. Bull Steamship Co., New York.

Hendon Chubb, of Chubb & Son, New York.

G. S. Dearborn, president American-Hawaiian Steamship Co., New York.

Andrew Fletcher, president, W. & A. Fletcher Co., Hoboken, N. J.

H. K. Fowler, of the Thames & Mersey Marine Insurance Co., Ltd., the Union Marine Insurance Co., Ltd., and other companies, New York.

J. R. Gordon, traffic manager, Union Sulphur Co., New York.

Edgar F. Luckenbach, Luckenbach Steamship Co., New York.

William H. McGee, of the St. Paul Fire & Marine Insurance Co., St. Paul, Minn., the Providence Washington Insurance Co., Providence, R. I.

Charles E. Mather, of Mather & Co., Philadelphia and New York.

Frank C. Munson, president, Munson Steamship Line, New York.

H. H. Raymond, president and general manager, Clyde Steamship Co. and Mallory Steamship Co., New York.

W. L. H. Simpson, of the British & Foreign Marine Insurance Co., Ltd., New York.

Alfred Gilbert Smith, president, New York & Cuba Mail Steamship Co., New York.

W. A. Thomas Jr., vice president, the Texas Co., New York.

R. C. Veit, president, Standard Transportation Co., New York.

#### Members in Other Cities

Holden A. Evans, president, Baltimore Dry Docks & Ship Building Co., Baltimore.

William Matson, president, Matson Navigation Co., San Francisco.

William Livingstone, president, Lake Carriers' Association, Detroit.

J. A. McGregor, president, Union Iron Works Co., San Francisco.

J. B. Levison, vice president, Fire-

man's Fund Insurance Co., San Francisco.

J. V. Paterson, Seattle, Wash.

J. Howard Pew, president Sun Co., Philadelphia.

Benjamin Rush, president, Insurance Co. of North America, Philadelphia.

Lewis K. Thurlow, Crowell & Thurlow, Boston.

C. S. Timberlake, general agent, Hartford Fire Insurance Co., Hartford, Conn.

W. F. Whittlesey, marine secretary, Aetna Insurance Co., Hartford, Conn.

F. M. Wood, president, Maryland Steel Co., Baltimore.

#### Chief Surveyor of the United States and Canada

James French.

#### Assistant

H. J. Cox.

#### Principal Engineer Surveyor

E. M. Salmon.

#### Secretary

R. P. Hutchinson.

The following changes have taken place on the London committee:

Sir John Ellerman, Sir Owen Philipps, Daniel Stephens and W. G. Noble have been elected members of the committee of Lloyds Register of Shipping.

Sir John Ellerman is chairman of the Ellerman Line, and he recently acquired the Wilson Line, Hull, Eng.

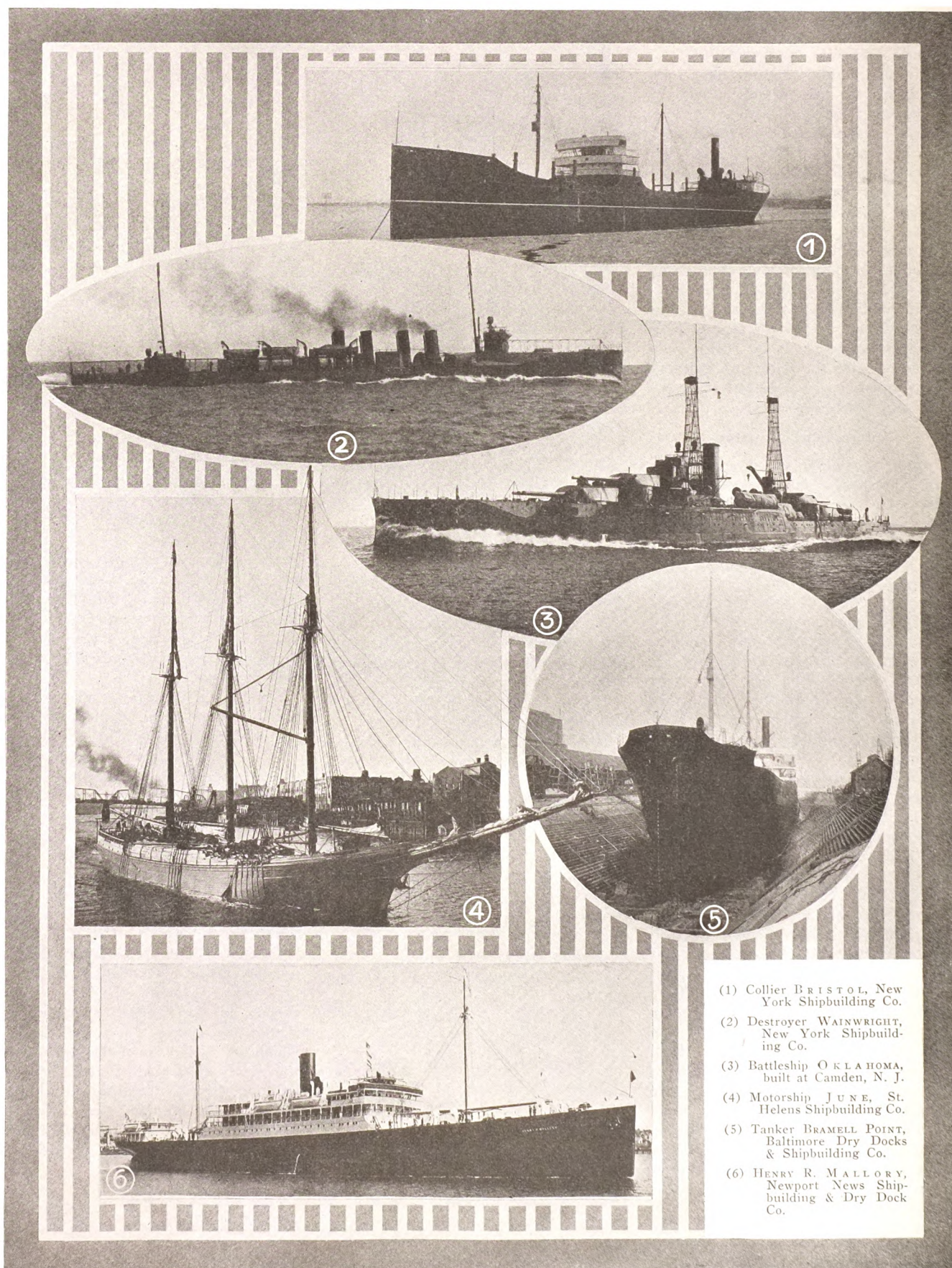
Sir Owen Philipps is chairman of the Royal Mail Steam Packet Co., Union Castle Line and Elder Dempster Line, and a director of the Pacific Steam Navigation Co., Lamport & Holt Line, H. & W. Nelson Line and other steamship companies.

Messrs. Stephens and Noble have been elected to fill the vacancies caused by the resignation of J. Knott and J. B. Adam. The latter signed on account of advancing years, after 25 years' valuable services to the society in the United Kingdom and also in the United States and Canada, which he visited in 1900 when there were only nine vessels of 62,000 tons building for classification with Lloyds Register of Shipping, as compared with the stupendous figures now under survey for classification with that society at all points.

Steamship WILLIAM A. McKENNEY, Crowell & Thurlow Steamship Co., Boston, is chartered for long term in trade between New York and South America.



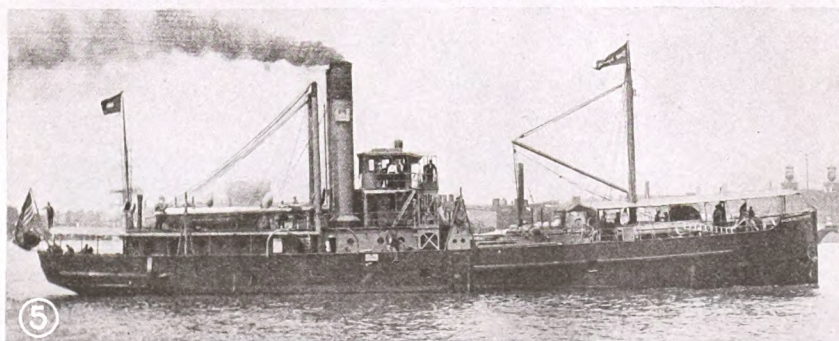
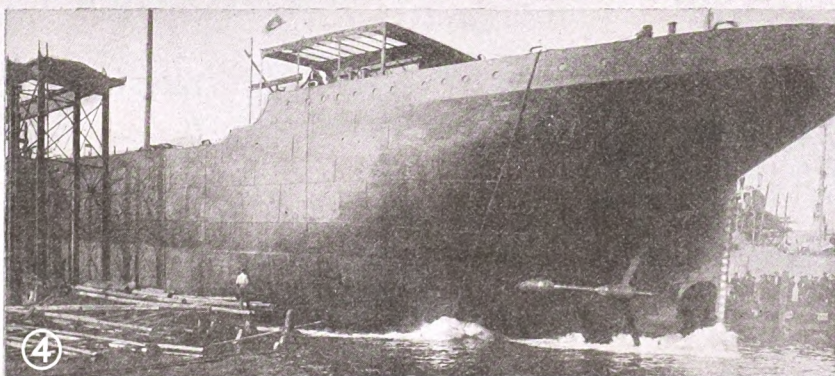
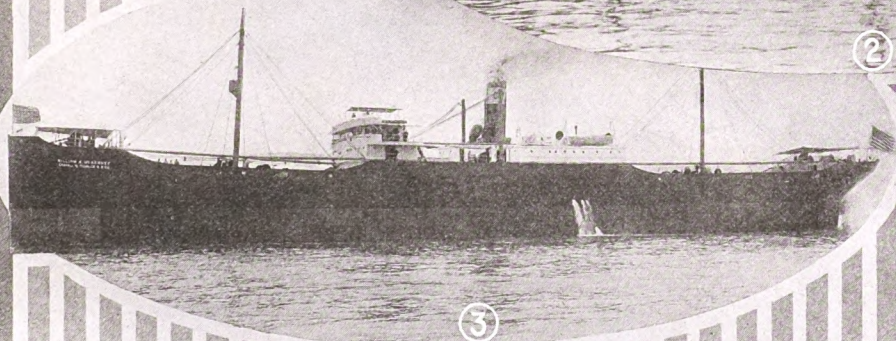
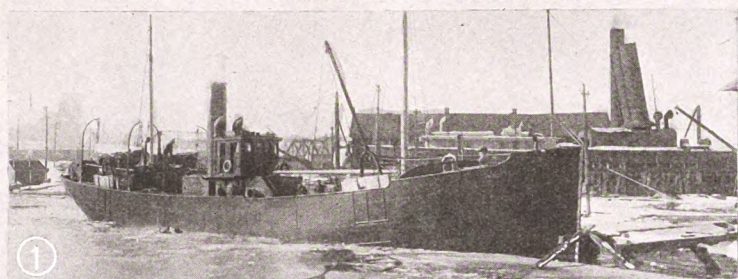
# American Ship Builders Turned Out



- (1) Collier BRISTOL, New York Shipbuilding Co.
- (2) Destroyer WAINWRIGHT, New York Shipbuilding Co.
- (3) Battleship OKLAHOMA, built at Camden, N. J.
- (4) Motorship JUNE, St. Helens Shipbuilding Co.
- (5) Tanker BRAMELL POINT, Baltimore Dry Docks & Shipbuilding Co.
- (6) HENRY R. MALLORY, Newport News Shipbuilding & Dry Dock Co.



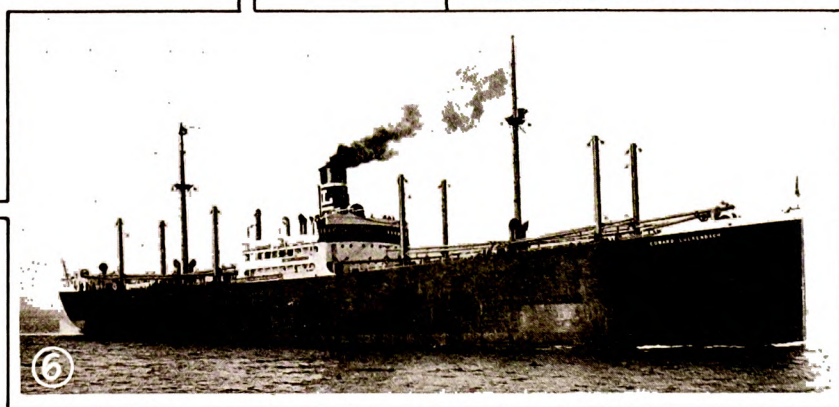
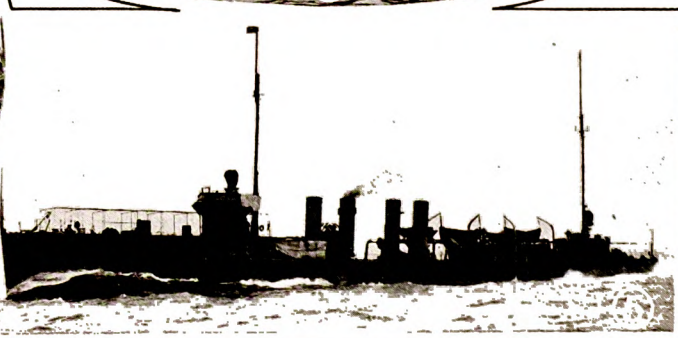
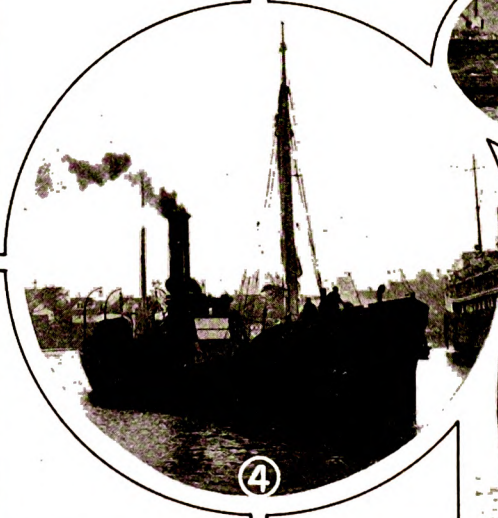
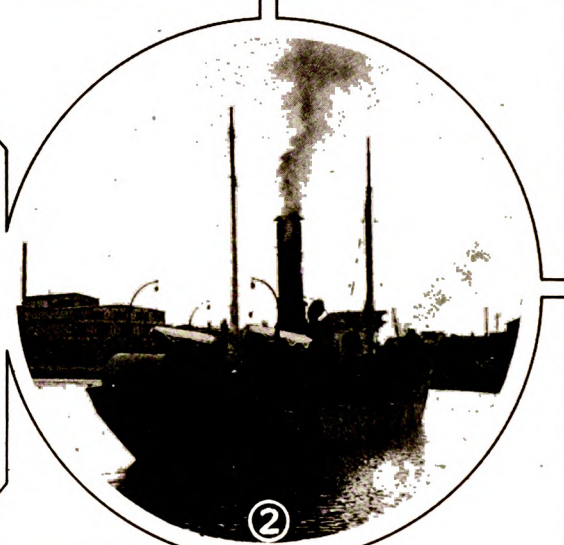
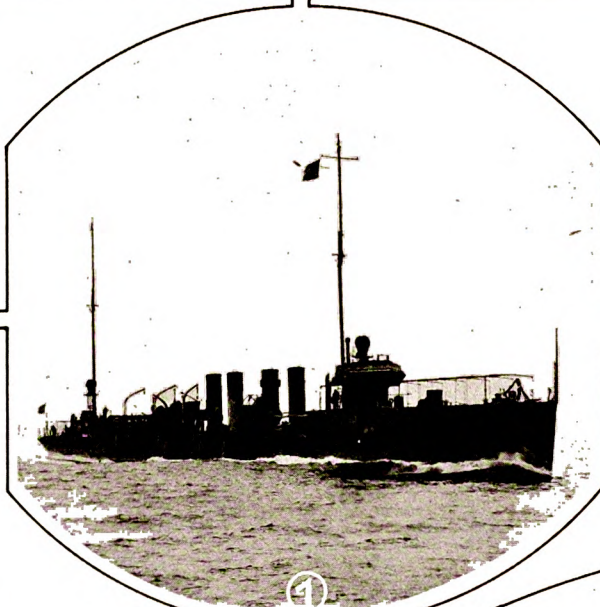
# Vessels of All Kinds During 1916



- (1) Trawler WHITECAP,  
Manitowoc Shipbuilding  
Co.
- (2) Tanker BRAMELL POINT,  
built at Baltimore.
- (3) WILLIAM A. MCKENNEY,  
built at Newport News.
- (4) Tanker HOLDEN EVANS,  
Baltimore Dry Docks  
& Shipbuilding Co.
- (5) U. S. Engineer's dredge  
SAN PABLO, Baltimore  
Dry Docks & Ship-  
building Co.



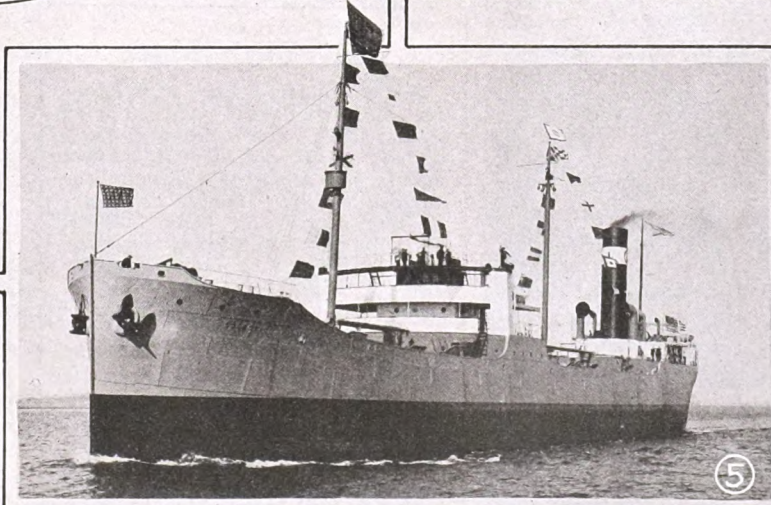
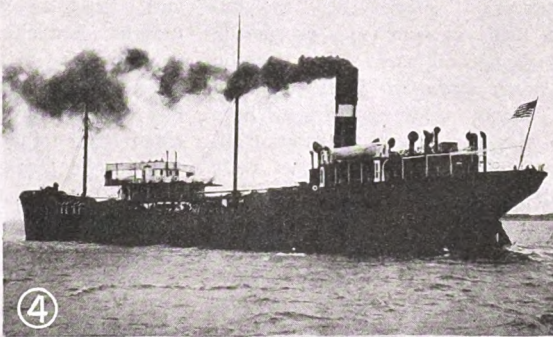
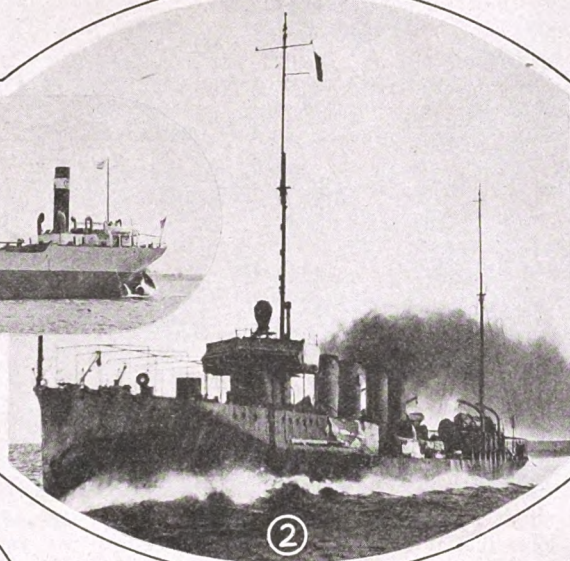
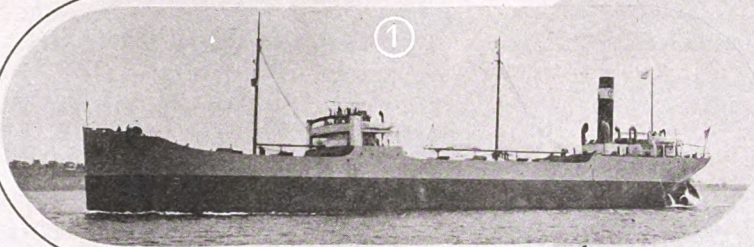
# U.S. Yards Were Equally Versatile



- (1) Destroyer ROWAN, Fore River Shipbuilding Corp.
- (2) Trawler COMBER, Manitowoc Shipbuilding Co.
- (3) Fireboat GEORGE A. WALLACE, another Manitowoc product.
- (4) These Manitowoc trawlers are for Atlantic service.
- (5) Destroyer SAMPSON, turned out at Quincy, Mass.
- (6) EDWARD LUCKENBACH, Fore River company.



# Whether the Craft Was Big or Small



- (1) CUBADIST, Fore River Shipbuilding Corp.
- (2) Destroyer TUCKER, Fore River company.
- (3) Motorship RUBY, St. Helens Shipbuilding Co.
- (4) NEW YORK, built at Quincy, Mass.
- (5) SUCROSA, another Fore River product.



# A Lively Year on Pacific Coast

Many New Steamship Companies Organized—Old Lines Combine  
—Oriental Traffic Tremendous—Ship Builders Enjoy Prosperity

By W. R. Osborn

**N**OTWITHSTANDING the fact that Pacific coast shipping had to grapple with many new problems during the past year in the way of freak legislation, the effect of the war on the markets of the world and the routing of ships, the lack of confidence in the Panama canal as a trade route, and the shortage of bottoms and consequent unprecedented charter and sale prices of vessels, the year as a whole was unusually satisfactory. During 1916, according to the official figures of United States customs officers, the total foreign trade for the districts of Alaska, Washington, Oregon, California and Hawaii will be \$608,000,000. Contrary to general opinion, the greatest

percentage is made up of the exports and imports of general commerce rather than munitions of war. The bulk of the trade is handled through the districts of Washington and San Francisco, Washington's total for the year being \$345,000,000 and the San Francisco districts \$240,000,000. The trade between Puget Sound and Japan has been first in importance and that between Puget Sound and Siberia second. These figures are far above the totals for any previous year as is the total for commerce with Alaska, which, including domestic gold, exceeds \$100,000,000. Gold in the past year dropped to third place, copper being first and salmon second in point of value in Alaskan commerce

There is an even greater boom in ship building, than in shipping, the most spectacular being the revival of wooden ship building and the rejuvenation, as far as has been possible, of every old windjammer that could carry canvass and some that it has since developed could not. Needless to say, everyone dealing in auxiliary machines or supplies, as well as the builders of steam engines and boilers and the local manufacturers of oil engines, are enjoying a full measure of prosperity, being in almost all cases in a position to turn down work which they cannot handle. Many additions have been made to the fleets of the coast companies and many new companies were organized.

## A Far-Reaching Consolidation

Probably the most interesting move in west coast shipping during the year was the recently announced amalgamation of the Pacific Coast Steamship Co. and the Pacific Alaska Navigation Co., through the efforts of H. F. Alexander, who now heads the new Pacific Steamship Co. The company also acquired the steamers YALE and HARVARD. This combination has placed 22 boats totaling approximately 60,000 gross tons under the one house flag, operating from Seattle to San Francisco; from San Francisco to San Diego and Los Angeles; from Seattle to southeastern and southwestern Alaska and from Seattle to Bering Sea points. The executive officers of the company are in Seattle.

Every company operating on the Pacific coast reports big increases in volume of business, and most of them have added to their fleets during the past year. The Alaska Steamship Co. acquired six boats, bringing the number which it is operating on three Alaskan routes, up to 17. The Border

Line Transportation Co. has added one vessel to its fleet of five which are operated on the southeastern Alaska route from Puget Sound. Its business has increased at least 25 per cent according to the company's estimates, last year's figures not yet being available. C. Henry Smith & Co., San Francisco, who entered the Puget Sound-South American trade about two years ago with the steamship BAJA CALIFORNIA and later SINALCA, have in the past few months doubled their fleet by the acquisition of GOVERNOR FORBES and REGULUS. That W. R. Grace & Co.'s trade has also been on the increase is indicated by the fact that they used 41 vessels in the trade from Puget Sound to South America during the year 1916 as compared with 32 during 1915, and acting as agents for the Johnson Line, comprised of six large motorships, they also had a sailing approximately every 60 days from San Francisco. Accord-

ing to a recent announcement by one of the directors of the company, the Johnson Line has definitely decided to extend its service to Seattle during the next six months.

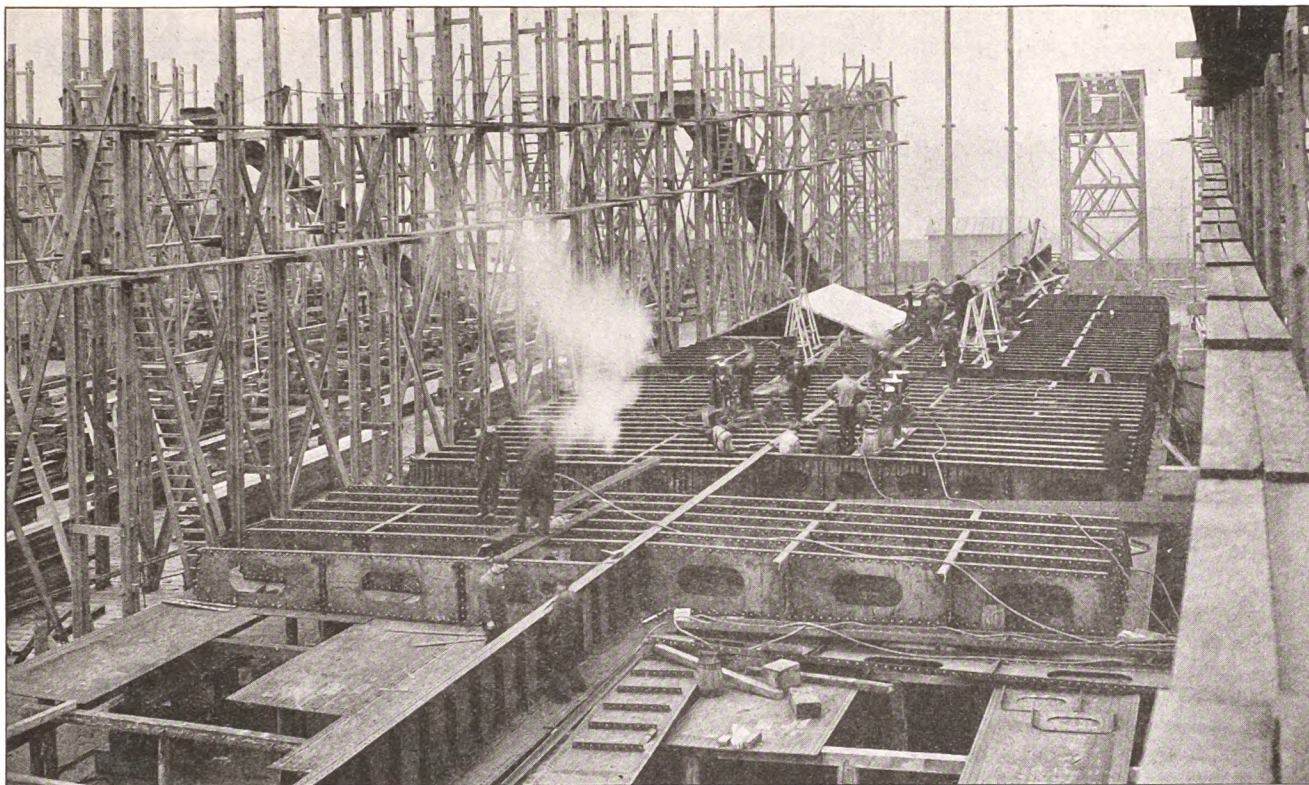
## Motorships on the Job

Another line of Scandinavian motorships, heretofore operating only to San Francisco, which will inaugurate service to Puget Sound is the Norway Pacific Line, commonly known as the Olsen line. GEORGE WASHINGTON, a 10,000-ton motorship on her maiden voyage, arrived at Seattle Jan. 15, 1917, inaugurating this service. Other motorships will follow as freight is offered, no dates of sailing being definitely fixed. The Norway Pacific Line is now having three more motorships built. Two of 10,000 tons each are under construction in Copenhagen and one of 6,000 tons is under construction in Christiania. The two 10,000-ton vessels are to be completed this spring and the 6,000-ton vessel in the early summer. These will be placed on the Norway Pacific route. H. F. Ostrander of Seattle, who had four sailings in 1915 from Puget Sound to Vladivostok had 15 sailings in 1916, and Frank Waterhouse & Co. of Seattle, which had 16 sailings in 1915, had 31 in the past year. James Griffiths & Son, also of Seattle, had 24 sailings in the service they inaugurated in January, 1916, from Seattle to Vladivostok and the Orient. In the Oriental trade the increase has been large, the Nippon Yusen Kaisha which, being a passenger line, is not permitted to carry certain munitions of war, had 26 sailings in 1915 and 31 in 1916. Six boats were on the run in 1915 and seven last year. The Osaka Shosen Kaisha increased its business in about the same proportion having about 35 sailings in the year 1915 compared with 50 in the year 1916.

## Building Ships

*Notwithstanding the tremendous increases of Pacific coast shipping during 1916, the increases in ship building have exceeded it. There has been a remarkable demand for wooden auxiliary lumber schooners ranging in capacity from 1,000,000 to 2,250,000 feet, board measure, but the activity is not confined to any one branch of work for it includes steel steamships, large wooden motorships and smaller gas vessels. Every yard on the coast from Vancouver to San Pedro is crowded with construction work and every few days announcement is made of some concern being incorporated for the purpose of ship building. No less than eight such concerns filed articles in Washington during the last 60 days of the year.*





BUILDING A STEEL SHIP AT PLANT OF J. F. DUTHIE &amp; CO., SEATTLE, WASH.

On Dec. 21, 1916, HANNA NEILSEN was accepted by her owner B. Stolt-Neilsen of Norway. This was the second 8,800-ton steel vessel turned out by the Skinner & Eddy Corporation of Seattle, from its plant located where last February there was nothing but an unimproved tract. On Oct. 21, 1916, when HANNA NEILSEN was launched, the keel was laid for a new vessel; there are five others in various stages of construction. Figures turned in to the United States department of commerce, bureau of navigation, show that the company has contracts for 11 ships with a total gross tonnage of 61,400.

J. F. Duthie & Co., of which C. D. Bowles of Portland is president, is completing a modern plant at Seattle and ways are in readiness for the first three of the seven steel vessels for which contracts are held. Steel for the three 8,800-ton steel vessels which the recently incorporated Ames Shipbuilding Co. will build will arrive Feb. 1. The Ames Shipbuilding Co. is building a permanent plant to take care of all kinds of repair work. The yard will include a 12,000-ton drydock.

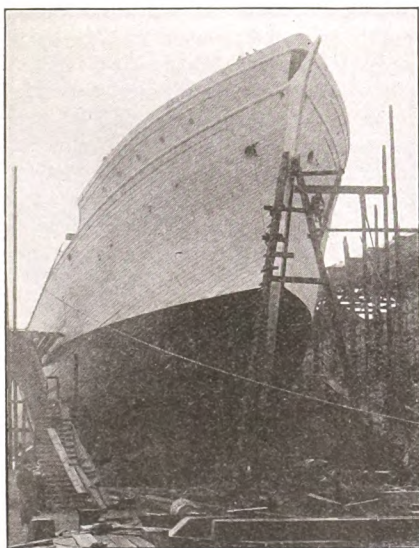
#### Plenty of Work Ahead

The old-established Seattle Construction & Drydock Co., which recently passed into the control of Wm. H. Todd, of the Todd Shipbuilding Co., and the Tietjen & Lang Drydock Co., New York City, reports contracts for 11 vessels aggregating 64,370 gross tons and since that time has been awarded a contract by the government for a war vessel at nearly \$5,000,000. Announcement was recently made that a 12,000-ton drydock would be added to the equipment of the plant and the dock is now under construction at Port Blakely. It will be built of wood, in three sections. Subsequent to the purchase of control of the Seattle plant the Todd interests incorporated the Todd Shipbuilding Co., capital \$1,200,000, and purchased a site of 100 acres of tide lands at Tacoma, Wash., for a plant, on which work has probably started by now. Two other companies were incorporated during the closing months of the year for steel ship building in

Tacoma, the Tacoma Shipbuilding Co., and Washington Shipbuilding Co., the latter holding contracts, according to reports, for the construction of eight 8,800-ton steel vessels. At Portland, four yards are now, or soon will be, building steel vessels whereas at the beginning of the year there was one.

The Union Iron Works Co., San Francisco, turned in an incomplete list to the bureau of navigation, on Nov. 1, 1916, which showed a total of 175,000 gross tons contracted for, more than any other yard in the United States.

Those best informed look upon the steel shipbuilding boom as a more or



BOW VIEW OF WOODEN AUXILIARY SANTINO



READY TO LAUNCH A WOODEN SHIP ON THE PACIFIC COAST



less lasting one, if the builders are not handicapped any more than at present. The threatened advance in the freight tariff on structural steel used in ships, from 65c to 75c per 100-lbs. is viewed with alarm. It is not that the difference of \$2 per ton on say 4,000 tons of steel required for a \$1,000,000 vessel will seriously menace the industry on the coast. The menace lies in the utter disregard of the carriers for the provision of the interstate commerce act which stipulates in words of one syllable that no interstate carrier may raise an established rate simply because of the withdrawal of water competition, but must first come before the commission and show cause for an increase aside from such withdrawal. Pacific coast builders fear the result of the establishment of such a precedent and when the tariffs announcing the raise were first filed, threats of suits have been heard from all quarters which have crystallized in the filing of a suit by the Skinner & Eddy Corporation. Steel ship building is also handicapped by the scarcity of skilled labor evidenced by the fact that the Ames Shipbuilding Co., of Seattle, is bringing a nucleus of 200 men for its new plant from the eastern seaboard.

These handicaps are not being felt by the builders of wooden vessels. What if they do need a million or a million and a half feet of lumber in the construction of a vessel? They have billions of most excellently adapted timber almost at their back door. These builders stand to reap a rich harvest. There are probably in excess of 60 wooden vessels contracted for on the Pacific coast whereas a year ago there was comparatively slight activity in the line. With few exceptions these vessels are designed primarily for lumber carrying. They range up to 2,250,000 feet in capacity, are nearly all schooners and are powered with either diesel or semi-diesel engines.

The Riley Shipbuilding Co., Buffalo, has a number of vessels lined up for repair work during the winter. A large amount of this work is now under way. The company also is building one large steel tug.

Steamship *NEWTON*, Capt. Chase, recently landed at Boston a 6,800-ton cargo of bituminous coal from Charleston, S. C. The ship was sent there owing to shortage of fuel at Chesapeake bay ports.

Two-master schooner *ELSIE M. HART*, Souris, P. E. I., for New York with cargo of potatoes, is at Boston for extensive repairs, having been battered by a gale that made assistance by coast guard cutter *ANDROSCOGGIN* necessary.

# Big Ship Built at Oakland

Largest Freighter Ever Turned Out  
at That Yard Now Ready to Sail

**T**HE Moore & Scott Iron Works, San Francisco, has just completed the largest vessel ever constructed in the company's ship yards at Oakland, Cal. This ship is *CAPTO*, of 7,100 tons deadweight. She has been turned over to her Norwegian owners.

*CAPTO* was ordered by James Rolph Jr., mayor of San Francisco, and head of the Rolph Navigation & Coal Co., on Jan. 1, 1916. The keel was laid in May, and in the same month the vessel, then known as *ANNETTE ROLPH*, was sold by Mr. Rolph to B. Stolt Nielsen, Haugesund, Norway. She was launched on Oct. 14, 1916, and was completed in December, well ahead of the contract date.

The vessel is 376 feet long, 52 feet 3 inches beam and 28 feet molded depth. She is equipped with a 2,400-horsepower Curtis turbine and with three boilers of the Scotch marine type. She will burn oil, being fitted with an oil burning system developed by the Moore & Scott company.

During the construction of the vessel the plant of the Moore & Scott company was considerably enlarged. A number of buildings were constructed, including a punch shed, mold loft, planing mill, joiner shop, pattern shop, power house and an office and administration building. Additional wharves and spur tracks also were added.

The company's success in the construction of the big ocean-going freighter has caused contracts for other large vessels to be obtained. These include two freighters of the same dimensions, a 425-foot tanker, and three freighters 402 feet 6 inches in length. The next vessel will be completed late in February.

## To Build Standard Ships

Germany is emulating the example set by England and America. Big German shipping men have formed a million-mark ship building company, which will immediately begin the construction at Hamburg of a series of 8,000-ton steamers for Germany's freight carrying trade after the war.

The strong Hamburg-American line is behind the new project, and Albert Ballin, director-general of that line, will be chairman of the board. The plan is to abandon temporarily the

custom of building huge special ships and concentrate on the construction of 10-knot boats—several at a time—which can be turned out faster and cheaper than steamers each requiring particular specifications. The ships' parts will be standardized and will be made probably at Hamburg.

## Isherwood System in 1916

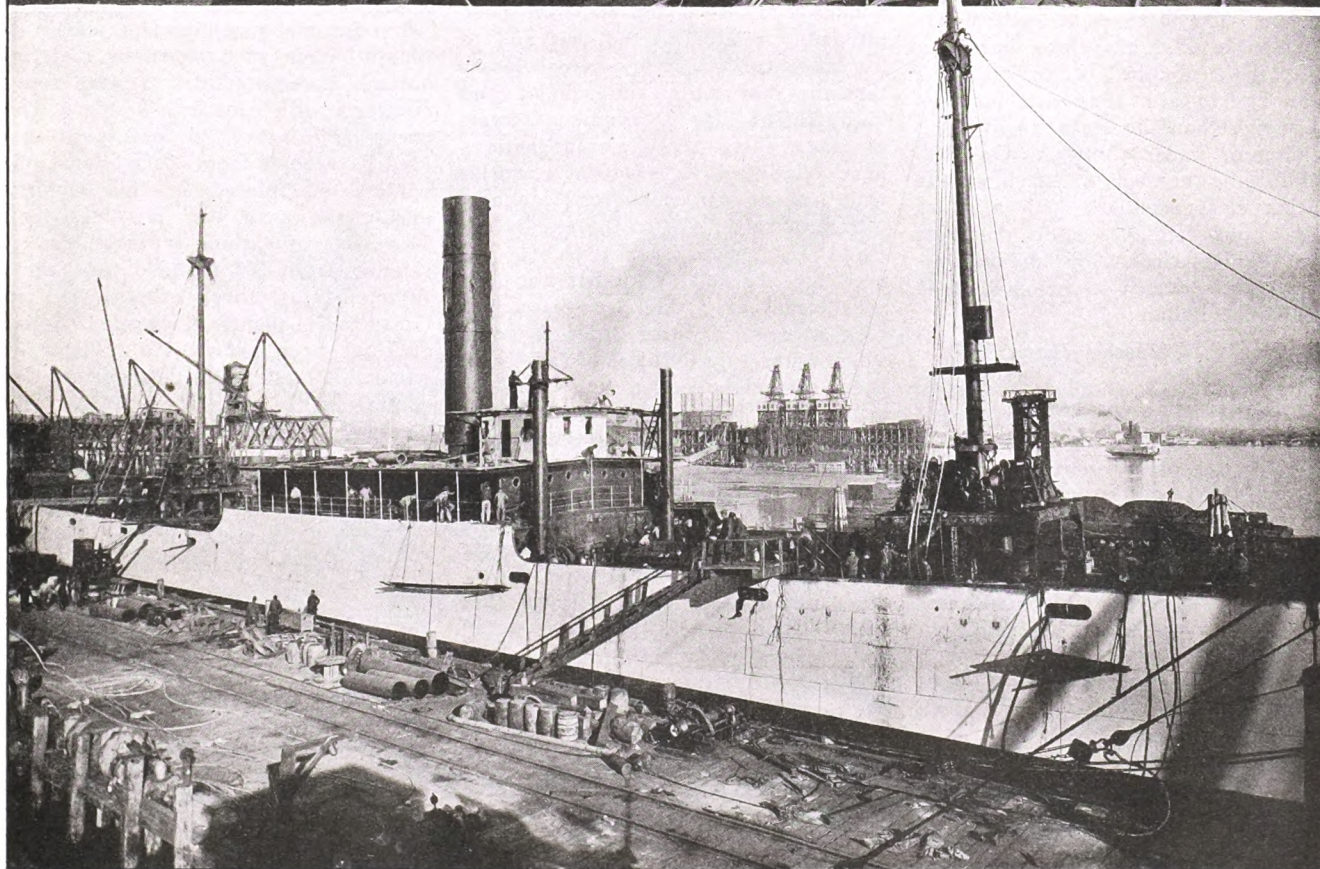
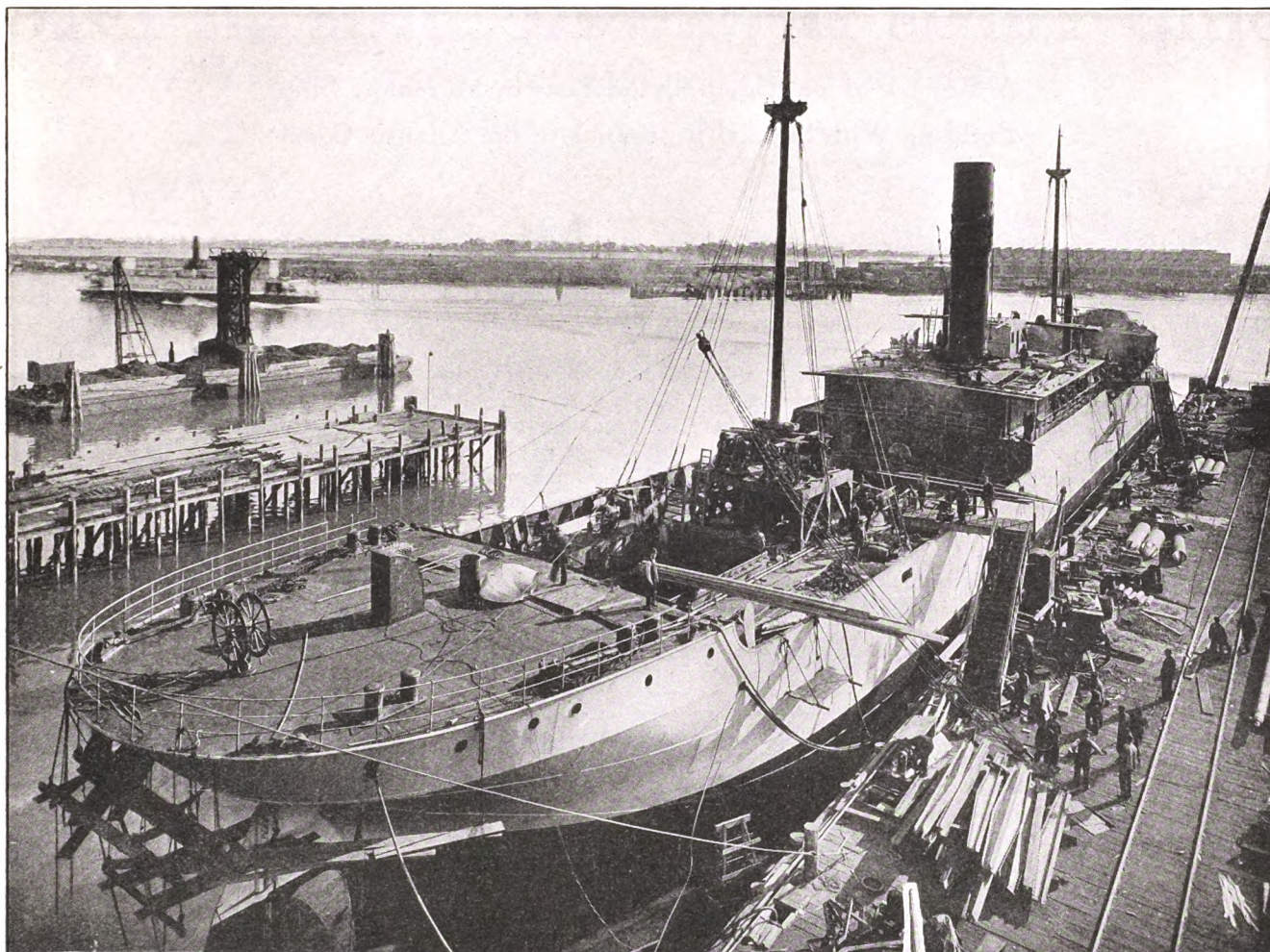
The year 1916, as far as Great Britain is concerned, was not very productive of merchant ship building; most of the construction of merchant vessels was carried on in the United States and Japan. Nevertheless the Isherwood system made considerable progress on foreign soil, according to statistics prepared in England by J. W. Isherwood. The number of Isherwood vessels contracted for up to Dec. 19, 1916, was 152, with a total gross tonnage of about 698,875, which is equivalent to about 1,000,000 tons in deadweight carrying capacity, thus making the total number of vessels built, under construction and on order 620, with an aggregate deadweight carrying capacity of 4,500,000 tons.

The following analysis shows the adaptability of the Isherwood system for various types and classes of vessels. The 620 vessels referred to above are classified as follows: 265 oil tank steamers aggregating 2,413,750 tons deadweight carrying capacity; 25 colliers and ore steamers aggregating 255,000 tons deadweight carrying capacity; nine passenger vessels aggregating 44,600 tons deadweight carrying capacity; 24 Great Lakes freighters aggregating 279,600 tons deadweight carrying capacity; 73 barges aggregating 25,850 tons deadweight carrying capacity; 221 general cargo vessels aggregating 1,645,200 tons deadweight carrying capacity; two dredges aggregating 760 gross register tons, and one trawler of 570 gross register tons.

In the United States well over 90 per cent of the oil tank tonnage at present under construction and about 50 per cent of the total merchant tonnage is claimed by the Isherwood system, as are also a very large number of the merchant ships now being built in Japan.

The three-mast schooner *GRACE G. BENNETT* has been rebuilt by the Delaware Shipbuilding Co., Seaford, Del.





OCEAN-GOING FREIGHTER OF 7,100 TONS DEADWEIGHT BEING FITTED OUT AT OAK LAND SHIP YARD



# Ship Yards Broke Records in 1916

A Review of an Unparalleled Year in Merchant Ship  
Building With Special Reference to the Atlantic Coast

By C. J. Stark

**C**IRCUMSTANCES incomparably favorable permanently checked the decadence of American ship building in 1915; also they brought about the achievements of a fresh and powerful industry in 1916. Both years have made imperishable contributions to the history of shipping in the United States; no year has done more, however, to speed the attainment of the goal—restoring the American flag to the high seas—than 1916.

In the magnitude of its activities and expansion, the past year is without parallel in the annals of modern ship building in this country. There were completed in American yards in that period approximately 1,200 merchant vessels of all descriptions with a gross tonnage of about 600,000. Of this total, approximately 150 were steel ships of over 400,000 gross tonnage. The remainder was made up of wooden craft. During the calendar year of 1915, there were launched in the United States, according to Lloyds, 84 steel merchant ships of 177,460 gross tonnage. The increase in modern cargo ships in 1916, therefore, has been more than double. Remarkable as these figures are, they are far less impressive than the statistics of work building or under contract. On Dec. 1, 1916, the number of steel vessels in this class was 400, with a gross tonnage of 1,428,003. For the first time the American ship building industry is practically on an equal basis with Great Britain.

## Hundreds of Vessels Being Built

On July 1, the number of vessels under construction was 385, of 1,225,784 gross tons; on Feb. 1, 1916, 230 of 901,371 gross tons; on Dec. 1, 1915, 202 of 761,511 tons, and on July 1, 1915, 76 of 310,089 gross tons. The steady growth of building is shown by these statistics. Previous to 1916, the high mark of steel merchant vessels building or under contract in American yards was July 1, 1907, when the total was 134, and the gross tonnage was 403,473. Of the work under construction Dec. 1, 1916, it is expected, according to government reports, that 294 vessels of 904,231 gross tons will be launched by July 1, 1917, and 106 ships of 523,772 gross tons by July 1, 1918. The number for 1918 completion has been increasing steadily

month by month. In wooden ships of 500 gross tons or over, there were building or under contract in private yards on Dec. 1, 1916, 116 craft of 156,615 gross tons.

The number and tonnage of steel vessels under construction or contracted for at the beginning of each month during 1916 is given in the following table, which is taken from government reports. These monthly reports began Feb. 1:

	Number	Tonnage
February .....	230	901,371
March .....	244	945,798
April .....	360	1,067,856
May .....	368	1,129,014
June .....	372	1,147,534
July .....	385	1,225,784
August .....	389	1,260,978
September .....	397	1,292,310
October .....	417	1,454,270
November .....	417	1,479,946
December .....	400	1,428,003

The same underlying conditions which stimulated anew American ship building in 1915, have remained in force throughout the past year, but their cumulative effect has been pronounced. These conditions have been intimately related to the war and to its influences which by actual losses through destruction, internment and impressment into government service of many ships of belligerent nations have continued to produce a worldwide shortage in commercial tonnage.

Freight rates, due to the excess demand for space have risen to unprecedented levels and it has not been an unusual case where a vessel has been able to pay for itself by only a few round trips. The ship market has been extremely active and fabulous prices have been paid by buyers for going vessels. Many ships which were thought long since to have filled their days of usefulness have been drawn back into active service by the pressing demand and attractive inducements for overseas tonnage and have quickly taken on a value several times that which their owners formerly would have been glad to accept.

In every neutral country of a maritime character, the construction of new ships has been speeded up as never before. The expansion of the ship building industry of the United States in a large measure has been a part of this general movement and apparently has been vitalized by the same fundamental causes. Japan,

Norway, Sweden and other countries have applied themselves energetically along this line. These countries have been handicapped, however, by inadequate home supplies of raw material, notably steel, and as they have been shut off largely from the great exporting nations of Germany, Great Britain and Belgium, they have been obliged to apply to the United States for large supplies. In addition, some of the belligerent countries, including Italy and even Great Britain herself, have been active buyers of ship material in this country.

The tremendous requirements of the home yards, added to the heavy export demands, have fairly overwhelmed the mills of the United States and have lead to such phenomenal prices as 6c, mill, or \$120 per ton, for plates passing Lloyds inspection. Buying of steel for vessels on contract is now extending into 1918, and there have been sales covering deliveries during the third quarter of next year.

## Foreigners Fill Our Yards

Foreign shipping interests, unable to obtain either yard space or material abroad, have continued to place many contracts with American builders. The great majority of the orders of this kind have come from Norwegian companies who placed in this country during the past year not less than 50 vessels of various types and sizes, ranging from 300 to 8,750 tons each. A number of these orders went to Great Lakes plants. Norwegian capital also has been behind the transfer of ownership and the enlargement of several of the American yards. The number of steel vessels for foreign owners completed in American yards in 1916, was 13, with a gross tonnage of 33,265.

The great demand for new tonnage in 1916 has been responsible for the most extensive expansion of ship yard facilities the United States has witnessed in the life of modern ship building. Many new yards have been established on both the Atlantic and Pacific coasts and the old plants have been greatly extended practically without exception. Some of the largest of these plans for increased yard facilities are in the preliminary stage and their completion is likely to come

(Concluded on page 61)



**Table I**  
**Vessels Built, Delivered or Launched in 1916**  
**Atlantic Coast Ship Yards**

Baltimore Dry Docks & Ship Building Co., Baltimore, Md.									
Name or Yard No.	Owner.	Type	Gross tonnage.	Speed, knots.	Length, Breadth and Depth, feet.	I. H. P.	Date launched		
Bramell Point.....	Vacuum Oil Co.....	Oil carrier..	3,250	10	293.0 x 47.0 x 28.0	1,650	July 1		
Pennant.....	Pierce Oil Corporation.....	Oil carrier..	3,253	10	293.0 x 47.0 x 28.0	1,100	Sept. 16		
Holden Evans.....	Bulk Oil Transportation Co.....	Oil carrier..	3,250	10	293.0 x 47.0 x 28.0	1,100	Oct. 28		
No. 77.....	Bulk Oil Transportation Co.....	Oil carrier..	3,250	10	293.0 x 47.0 x 28.0	1,100	Dec. 20		
Bath Iron Works, Bath, Me.									
Winchester.....	P. W. Rouss.....	Yacht.....	399	31.5	225.0 x 21.0 x 11.7	7,000	April 29		
Hull 71.....	New York Central Railroad.....	Car float....	....	....	265.0 x 40.1 x 10.0	....	July 26		
Bethlehem Steel Co., Sparrows Point, Md.									
Artisan.....	American-Hawaiian Steamship Co.....	Freight.....	5,825	10½	389.5 x 54.5 x 32.5	2,500	Jan. 1		
Arborean.....	American-Hawaiian Steamship Co.....	Freight.....	5,825	10½	389.5 x 54.5 x 32.5	2,500	Feb. 29		
Margaret.....	A. H. Bull & Co.....	Freight.....	3,372	9	328.5 x 46.0 x 25.5	1,500	Mar. 20		
Munsomo.....	Munson Steamship Co.....	Freight.....	3,315	10	328.5 x 46.0 x 25.5	2,300	April 29		
Munplace.....	Munson Steamship Co.....	Freight.....	3,315	10	328.5 x 46.0 x 25.5	2,300	April 10		
Cornelia.....	Bull Insular Co.....	Freight.....	3,216	12	328.5 x 46.5 x 26.3	2,500	Aug. 3		
Helen.....	Bull Insular Co.....	Freight.....	3,216	12	328.5 x 46.5 x 26.3	2,500	Sept. 29		
Munrio.....	Munson Steamship Co.....	Freight.....	3,868	10	334.5 x 48.0 x 27.5	2,300	Sept. 14		
Chester Ship Building Co., Chester, Pa.									
Malmanger.....	Westfal Larsen.....	Oil carrier..	5,500	10½	401.0 x 54.0 x 32.8	....	Aug. ..		
Golaa.....	Frithi Siegwarth.....	Oil carrier..	5,500	10½	401.0 x 54.0 x 32.8	....	Nov. ..		
Clinton Ship Building & Repair Co., Philadelphia									
Doctor Brooks.....	James J. McNally.....	Schr. Bge....	562	....	.....	....	July 30		
Fore River Ship Building Corporation, Quincy, Mass.									
Cubadist.....	Cuba Distilling Co.....	Molasses ..	5,788	10½	406.0 x 54.5 x 32.5	....	April 15		
Sucrosa.....	Cuba Distilling Co.....	Molasses ..	5,788	10½	406.0 x 54.5 x 32.5	....	Mar. 1		
Edward Luckenbach.....	Luckenbach Steamship Co.....	Freight.....	8,151	12	456.4 x 57.0 x 41.6	....	June 1		
Harlan & Hollingsworth Corporation, Wilmington, Del.									
Pearl Shell.....	Shell Co. of California.....	Oil carrier..	5,614	11	427.0 x 53.5 x 31.0	2,950	July 1		
Geo. E. Paddleford.....	Pan-American Petroleum & Transportation Co.....	Oil carrier..	4,787	11	404.0 x 51.0 x 30.2	2,765	April 18		
Georgeanna Weems.....	Baltimore & Carolina Steamship Co.....	Freight.....	2,089	10	255.0 x 39.0 x 28.0	800	Oct. 11		
City of Camden.....	Wilmington Steamboat Co.....	River.....	731	15½	203.0 x 40.0 x 11.4	1,200	Mar. 4		
Newport News Ship Building & Dry Dock Co., Newport News, Va.									
Charles Pratt.....	Standard Oil Co.....	Oil carrier..	9,059	10½	.....	3,000	.....		
H. H. Rogers.....	Standard Oil Co.....	Oil carrier..	10,050	10½	.....	3,000	.....		
Edgar F. Luckenbach.....	Edgar F. Luckenbach.....	Freight.....	8,061	....	.....	3,600	.....		
Antwerpen.....	Standard Oil Co.....	Oil carrier..	7,955	10½	.....	2,800	.....		
Henry R. Mallory.....	Mallory Steamship Co.....	Frt. & Pass.	6,063	14	.....	4,000	.....		
Munabro.....	Munson Steamship Co.....	Freight.....	4,293	10½	.....	1,700	.....		
Wm. A. McKenney.....	Crowell & Thurlow Steamship Co.....	Freight.....	6,256	10	.....	2,200	.....		
New York Ship Building Co., Camden, N. J.									
Bristol.....	Coastwise Transportation Co.....	Collier.....	3,971	10	360.0 x 49.0 x 30.0	1,950	Jan. 15		
Standard Arrow.....	Standard Transportation Co.....	Tanker.....	7,794	11	468.0 x 62.5 x 39.5	3,200	May 15		
No. 178.....	New York Central Railroad.....	Carfloat.....	744	....	260.0 x 40.1 x 10.0	....	Aug. 17		
No. 179.....	New York Central Railroad.....	Carfloat.....	744	....	260.0 x 40.1 x 10.0	....	July 5		
Royal Arrow.....	Standard Transportation Co.....	Tanker.....	7,794	11	468.0 x 62.5 x 39.5	3,200	Oct. 30		
No. 180.....	New York Central Railroad.....	Carfloat.....	744	....	260.0 x 40.1 x 10.0	....	Nov. 9		
No. 181.....	New York Central Railroad.....	Carfloat.....	744	....	260.0 x 40.1 x 10.0	....	Dec. 5		
Pusey & Jones Co., Wilmington, Del.									
No. 220.....	Pennsylvania Railroad.....	Derrick Bge.	328	....	100.5 x 34.5 x 9.5	....	Jan. 28		
No. 227.....	Pennsylvania Railroad.....	Derrick Bge.	328	....	100.5 x 34.5 x 9.5	....	May 10		
No. 272.....	Pennsylvania Railroad.....	Derrick Bge.	328	....	100.5 x 34.5 x 9.5	....	July 11		
No. 3.....	New York Central Railroad.....	Tug.....	300	....	107.0 x 24.5 x 12.5	....	July 18		
No. 9.....	New York Central Railroad.....	Tug.....	300	....	107.0 x 24.5 x 12.5	....	Nov. 9		
Staten Island Ship Building Co., Port Richmond, N. Y.									
Hudson.....	International Elevator Co.....	Elevator ..	500	....	125.0 x 34.0 x 11.8	....	Feb. 5		
No. 151.....	Pennsylvania Railroad Co.....	Lighter.....	300	....	110.0 x 32.0 x 14.9	350	May 24		
No. 14.....	New York Central Railroad Co.....	Lighter.....	556	....	114.0 x 30.5 x 14.5	300	Aug. 7		
Athens.....	Lehigh Valley Railroad Co.....	Tug.....	241	....	108.0 x 26.5 x 14.5	950	Sept. 30		
Tank-Ship Building Corporation, Newburgh, N. Y.									
Navagadora No. 72.....	Tampico Navigation Co.....	Oil tank Bgs.	419	....	165.3 x 37.8 x 8.9	....	Aug. ..		
Navagadora No. 73.....	Tampico Navigation Co.....	Oil tank Bgs.	419	....	165.3 x 37.8 x 8.9	....	Aug. ..		
Navagadora No. 74.....	Tampico Navigation Co.....	Oil tank Bgs.	419	....	165.3 x 37.8 x 8.9	....	Sept. ..		
Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia									
J. M. Danziger.....	Pan-American Petroleum & Transportation Co.....	Oil carrier..	6,485	11	430.0 x 58.0 x 33.4	2,800	June 28		
Jalisco.....	Mexican Navigation Co.....	Pass. & Frt.	2,585	10	305.0 x 45.0 x 22.8	1,350	Feb. 7		
Coahuila.....	Mexican Navigation Co.....	Pass. & Frt.	2,585	10	305.0 x 45.0 x 22.8	1,350	April 1		
Sunail.....	Sun Co.....	Oil carrier..	7,157	11	430.0 x 58.0 x 33.4	2,800	Aug. 31		
William Rockefeller.....	Sun Co.....	Oil carrier..	7,157	11	430.0 x 58.0 x 33.4	2,800	Nov. 22		
Joseph R. Parrott.....	Florida East Coast Railroad.....	Car ferry....	2,406	12	337.4 x 57.0 x 22.0	2,700	Sept. 25		
Great Lakes Ship Yards									
American Ship Building Co., Cleveland									
Henry G. Dalton...	Interlake Steamship Co.....	Bulk Ftr....	7,810	10	600.0 x 60.0 x 32.0	2,000	.....		
D. G. Kerr.....	Pittsburgh Steamship Co.....	Bulk Ftr....	7,756	10	600.0 x 60.0 x 32.0	2,000	.....		
Emory L. Ford.....	Herbert K. Oakes.....	Bulk Ftr....	7,986	10	600.0 x 60.0 x 32.0	2,000	.....		
Herbert F. Black...	M. A. Hanna & Co.....	Bulk Ftr....	6,262	11	545.0 x 58.0 x 31.0	1,800	.....		
George L. Eaton.....	George Hall Coal Co.....	Freight.....	2,100	9½	261.0 x 43.5 x 20.0	1,100	.....		
Gisla.....	A. O. Lindvig.....	Freight.....	2,100	9½	261.0 x 43.5 x 20.0	1,100	.....		
Gaute.....	A. O. Lindvig.....	Freight.....	2,100	9½	261.0 x 43.5 x 20.0	1,100	.....		



# Table I

(Concluded)

## Vessels Built, Delivered or Launched in 1916

### Great Lakes Ship Yards

(Concluded)

#### American Ship Building Co. (Concluded)

Name or Yard No.	Owner.	Type	Gross tonnage.	Speed, knots.	Length, Breadth and Depth, feet.	I. H. P.	Date launched
Vestland .....	Erling Lund .....	Freight ....	2,100	9½	261.0 x 43.5 x 20.0	1,100	.....
Levisa .....	Hasler Bros., Inc. ....	Freight ....	2,100	9½	261.0 x 43.5 x 20.0	1,100	.....
Lars Postenes .....	Barber & Co., Inc. ....	Freight ....	2,118	9½	261.0 x 43.5 x 20.0	1,100	.....
Ozama .....	Atlantic, Gulf & West Indies Steamship Lines	Freight ....	2,118	9½	261.0 x 43.5 x 20.0	1,100	.....
Carib .....	Atlantic, Gulf & West Indies Steamship Lines	Freight ....	2,118	9½	261.0 x 43.5 x 20.0	1,100	.....
Sir Trevor Dawson .....	Roy M. Wolvin .....	Bulk Ftr. ....	7,215	10	600.0 x 60.0 x 32.0	2,000	.....
Nordal .....	Erling Lund .....	Freight ....	2,029	9½	261.0 x 43.5 x 20.0	1,100	.....
Manta .....	Atlantic, Gulf & West Indies Steamship Lines	Freight ....	2,081	9½	261.0 x 43.5 x 20.0	1,100	.....
Johan Mjelde .....	A. H. Skaugaards .....	Freight ....	2,100	9½	261.0 x 43.5 x 20.0	1,100	.....
Gijones .....	Arthur Mathiesen .....	Freight ....	2,100	9½	261.0 x 43.5 x 20.0	1,100	.....
No. 82 .....	Standard Transportation Co. ....	Oil barge .....	2,300	.....	261.0 x 43.5 x 20.0	.....	.....
Sioux .....	Atlantic, Gulf & West Indies Steamship Lines	Freight ....	2,048	9½	261.0 x 43.5 x 20.0	1,100	.....

#### Great Lakes Engineering Works, Detroit

Corona .....	Corona Coal Co. ....	Freight ....	2,500	10	261.0 x 43.0 x 20.0	1,100	.....
Conneaut .....	Wyandotte Transportation Co. ....	Freight ....	4,749	10	440.0 x 56.0 x 30.0	1,775	.....
W. A. McGonagle .....	Pittsburgh Steamship Co. ....	Bulk Ftr. ....	7,811	10	600.0 x 60.0 x 32.0	2,000	.....
Sekstant .....	Sekstant Joint Stock Co. ....	Freight ....	2,489	10	261.0 x 43.5 x 20.0	1,100	.....
Maitland .....	Toronto, Hamilton & Buffalo Railroad .....	Car ferry .....	2,757	13	.....	.....	.....
Resolute .....	Merritt & Chapman Derrick & Wrecking Co. ....	Tug .....	453	10	142.0 x 30.0 x 16.0	750	.....
.....	Clinchfield Navigation Co. ....	Collier .....	2,532	10	261.0 x 43.0 x 20.0	1,100	.....
Munisla .....	J. L. Crosthwaite .....	Freight ....	1,697	10	256.3 x 43.0 x 19.2	700	.....
Philadelphia .....	Atlantic, Gulf & West Indies Steamship Lines	Freight ....	2,482	10	261.0 x 43.0 x 20.0	.....	.....
Norfolk .....	Clyde Steamship Co. ....	Freight ....	2,482	10	261.0 x 43.0 x 20.0	1,100	.....
Clinchwood .....	Clinchfield Navigation Co. ....	Collier .....	2,532	10	261.0 x 43.0 x 20.0	1,100	.....
Ginzel No. 1 .....	.....	Barge .....	416	.....	.....	.....	.....
Edith J. Osgood .....	.....	Freight ....	2,483	10	261.0 x 43.0 x 20.0	1,100	.....
P. L. M. No. 4 .....	Alberto A. Dodero (Uruguay) .....	Freight ....	2,639	10	.....	.....	.....
P. L. M. No. 5 .....	Alberto A. Dodero (Uruguay) .....	Freight ....	2,639	10	.....	.....	.....

#### Manitowoc Ship Building Co., Manitowoc, Wis.

Surge .....	Bay State Fishing Co. ....	Trawler ....	303	10	135.0 x 22.5 x 14.3	600	June 14
Comber .....	Bay State Fishing Co. ....	Trawler ....	303	10	135.0 x 22.5 x 14.3	600	July 1
Whitcap .....	Bay State Fishing Co. ....	Trawler ....	303	10	135.0 x 22.5 x 14.3	600	Aug. 26
Tide .....	Bay State Fishing Co. ....	Trawler ....	303	10	135.0 x 22.5 x 14.3	600	Oct. 7

#### Toledo Ship Building Co., Toledo, O.

Starlite .....	Standard Oil Co. of New Jersey .....	Aux. Schr. ....	1,930	7	261.0 x 43.5 x 23.5	320	April 20
Moonlite .....	Standard Oil Co. of New Jersey .....	Aux. Schr. ....	1,930	7	261.0 x 43.5 x 23.5	320	April 29
Twilite .....	Standard Oil Co. of New Jersey .....	Aux. Schr. ....	1,955	7	261.0 x 43.5 x 23.5	320	July 29
Dawnlite .....	Standard Oil Co. of New Jersey .....	Aux. Schr. ....	1,976	7	261.0 x 43.5 x 23.5	320	Oct. 20
Sunlite .....	Standard Oil Co. of New Jersey .....	Aux. Schr. ....	1,976	7	261.0 x 43.5 x 23.5	320	Oct. 28
Daylite .....	Standard Oil Co. of New Jersey .....	Aux. Schr. ....	1,976	7	261.0 x 43.5 x 23.5	320	Nov. 11

### Pacific Coast Ship Yards

#### Seattle Construction & Dry Dock Co., Seattle, Wash.

Cauto .....	New York & Cuba Mail Steamship Co. ....	Pass. & Ftr. ....	3,820	12	368.0 x 47.8 x 27.3	2,500	Sept. 23
Panuco .....	New York & Cuba Mail Steamship Co. ....	Pass. & Ftr. ....	3,820	12	368.0 x 47.8 x 27.3	2,500	Oct. 21

#### Skinner & Eddy Corporation, Seattle, Wash.

Niels Nielsen .....	B. Stolt Nielsen .....	Freight ....	5,730	11½	410.5 x 54.0 x 29.8	2,500	Sept. 21
Hanna Nielsen .....	B. Stolt Nielsen .....	Freight ....	5,730	11½	410.5 x 54.0 x 29.8	2,500	Oct. 21

#### Union Iron Works Co., San Francisco, Cal.

Los Angeles .....	Union Oil Co. of California .....	Oil carrier .....	6,876	10½	435.0 x 56.0 x 33.5	2,600	Feb. 5
D. G. Scofield .....	Standard Oil Co. of California .....	Oil carrier .....	8,653	11	440.0 x 58.0 x 41.0	3,300	June 3
Acme .....	Standard Transportation Co. of Del. ....	Oil carrier .....	6,895	10½	435.0 x 56.0 x 33.5	2,600	April 29
Davanger .....	Wilhelm Tarkeldson .....	Freight ....	5,876	10½	400.0 x 56.0 x 32.0	2,400	June 18
Maui .....	Matson Navigation Co. ....	Pass. & Ftr. ....	9,728	15½	484.0 x 58.0 x 36.5	10,000	Dec. ..
Astral .....	Standard Transportation Co. of Del. ....	Oil carrier .....	8,653	11	440.0 x 58.0 x 41.0	3,300	Aug. 20
H. C. Folger .....	Atlantic Oils Refining Co. ....	Oil carrier .....	7,185	10½	435.0 x 56.0 x 33.5	2,600	Oct. 24
J. W. VanDyke .....	Atlantic Oils Refining Co. ....	Oil carrier .....	7,185	10½	435.0 x 56.0 x 33.5	2,600	Nov. 26
Paulsboro .....	Vacuum Oil Co. ....	Oil carrier .....	7,185	10½	435.0 x 56.0 x 33.5	2,600	Aug. 6
Talabot .....	N. S. Bjoeness .....	Freight ....	6,115	10½	410.0 x 56.0 x 33.5	2,600	Nov. 11

### Inland River Ship Yards

#### American Bridge Co., New York

*Four .....	Aluminum Ore Co. ....	Ore barge .....	†2,000	.....	.....	.....	†Mississippi River
*Five .....	Crucible Fuel Co. ....	Coal barge .....	†2,350	.....	.....	.....	†Monongahela River
*Four .....	Lehigh Valley Railroad Co. ....	Car float .....	†3,400	.....	.....	.....	†New York Harbor
*One .....	Rodgers Sand Co. ....	Sand barge .....	310	.....	.....	.....	†Allegheny River
*One .....	Morgans L. & T. Railroad .....	Car float .....	1,350	.....	.....	.....	†New Orleans Harbor
*Nine .....	American Steel & Wire Co. ....	Coal barge .....	†1,944	.....	.....	.....	†Monongahela River

\*Number of vessels. †Aggregate tonnage. ‡Service.

#### Charles Barnes Co., Cincinnati, O.

Captain Sturt .....	South Australian Government .....	Freight ....	250	.....	138.0 x 28.0 x 4.3	100	Aug. ..
---------------------	-----------------------------------	--------------	-----	-------	--------------------	-----	---------

#### Howard Ship Yards Co., Jeffersonville, Ind.

Inco No. 1 .....	Inland Navigation Co. ....	Barge .....	1,473	.....	.....	.....	.....
Minnesota .....	William J. Mayo .....	Yacht .....	211	9½	.....	.....	.....



## Table II

### Merchant Tonnage Building Jan. 1, 1917

#### Atlantic Coast Ship Yards

##### Baltimore Dry Docks & Shipbuilding Co., Baltimore

Name or Yard No.	Owner.	Type	Gross tonnage.	Speed, knots.	Length, Breadth and Depth, feet.	I. H. P.	If not launched give probable date.
No. 78.....	Bulk Oil Transportation Co.....	Oil carrier..	3,250	10	293.0 x 47.0 x 28.0	1,300	April, '17
No. 79.....	Bulk Oil Transportation Co.....	Oil carrier..	3,250	10	293.0 x 47.0 x 28.0	1,300	June, '17
No. 80.....	Bulk Oil Transportation Co.....	Oil carrier..	3,250	10	293.0 x 47.0 x 28.0	1,300	Feb., '17
No. 81.....	Gustav Bull .....	Freight .....	4,150	11½	340.0 x 49.0 x 28.5	1,800	Aug., '17
No. 82.....	Gustav Bull .....	Freight .....	4,150	11½	340.0 x 49.0 x 28.5	1,800	Sept., '17
No. 83.....	.....	Freight .....	4,150	11½	340.0 x 49.0 x 28.5	1,800	Jan., '18
No. 84.....	.....	Freight .....	4,150	11½	340.0 x 49.0 x 28.5	1,800	Feb., '18

##### Bath Iron Works, Bath, Me.

Hull 72.....	New York Central Railroad.....	Car float....	.....	.....	265.0 x 40.1 x 10.0	.....	Jan., '17
Isabel .....	J. N. Willys.....	Yacht .....	910	26	230.0 x 26.2 x 14.2	8,400	.....

##### Bethlehem Steel Co., Sparrows Point, Md.

Jas. McGee .....	Standard Oil Co.....	Oil carrier..	10,000	10½	500.0 x 68.0 x 30.5	3,000	Jan., '17
W. C. Teagle.....	Standard Oil Co.....	Oil carrier..	10,000	10½	500.0 x 68.0 x 30.5	3,000	Feb., '17
Cubore .....	Ore Steamship Corporation.....	Freight .....	7,352	10	450.0 x 57.0 x 37.0	2,800	May, '17
Feltore .....	Ore Steamship Corporation.....	Freight .....	7,352	10	450.0 x 57.0 x 37.0	2,800	June, '17
Bethore .....	Ore Steamship Corporation.....	Freight .....	6,914	10	500.0 x 66.0 x 42.0	3,500	Sept., '17
No. 163.....	Munson Steamship Co.....	Freight .....	5,750	12	369.0 x 48.0 x 27.4	2,500	June, '17
Beatrice .....	A. H. Bull & Co.....	Freight .....	3,455	9	328.6 x 46.0 x 25.5	1,750	Jan., '17
Santore .....	Ore Steamship Corporation.....	Freight .....	7,352	10	450.0 x 57.0 x 37.0	2,800	Aug., '17
Firmore .....	Ore Steamship Corporation.....	Freight .....	7,352	10	450.0 x 57.0 x 37.0	2,800	Oct., '17
No. 167.....	M. Mjelde .....	Freight .....	5,440	10	377.0 x 52.0 x 29.5	2,000	Sept., '17
No. 168.....	.....	Freight .....	4,100	9½	358.0 x 50.0 x 27.4	1,500	Nov., '17
No. 169.....	.....	Freight .....	4,100	9½	358.0 x 50.0 x 27.4	1,500	Dec., '17
No. 170.....	.....	Freight .....	5,440	10	377.0 x 52.0 x 29.5	2,000	Feb., '18
No. 171.....	Bethlehem Steel Co.....	Tug .....	.....	.....	125.0 x 29.0 x 15.0	1,000	.....
No. 172.....	Standard Oil Co.....	Oil carrier..	8,400	10½	465.6 x 60.0 x 29.5	3,000	May, '18

##### Chester Ship Building Co., Chester, Pa.

No. 340.....	American Owners .....	Freight .....	5,000	10½	.....	.....	..... '17
No. 341.....	Foreign Account .....	Oil carrier..	5,500	10½	401.0 x 54.0 x 36.8	.....	..... '17
No. 342.....	Foreign Account .....	Oil carrier..	5,500	10½	401.0 x 54.0 x 36.8	.....	..... '17
No. 343.....	Foreign Account .....	Oil carrier..	5,500	10½	401.0 x 54.0 x 36.8	.....	..... '17
No. 344.....	Foreign Account .....	Oil carrier..	5,500	10½	401.0 x 54.0 x 36.8	.....	Feb., '17
No. 345.....	Foreign Account .....	Oil carrier..	5,500	10½	401.0 x 54.0 x 36.8	.....	April, '17
No. 346.....	Foreign Account .....	Freight .....	5,500	10½	401.0 x 54.0 x 36.8	.....	April, '17
No. 347.....	Shawmut Steamship Co.....	Freight .....	5,500	10½	401.0 x 54.0 x 36.8	.....	Mar., '17
No. 348.....	Shawmut Steamship Co.....	Freight .....	5,500	10½	401.0 x 54.0 x 36.8	.....	..... '17
No. 350.....	Foreign Account .....	Oil carrier..	5,500	10½	401.0 x 54.0 x 36.8	.....	Jan., '17
No. 351.....	Foreign Account .....	Freight .....	5,500	10½	401.0 x 54.0 x 36.8	.....	..... '17
No. 352.....	Foreign Account .....	Freight .....	5,500	10½	401.0 x 54.0 x 36.8	.....	..... '17
No. 353.....	Foreign Account .....	Freight .....	5,500	10½	401.0 x 54.0 x 36.8	.....	..... '17
No. 356.....	Foreign Account .....	Freight .....	5,500	10½	401.0 x 54.0 x 36.8	.....	..... '18

##### Clinton Ship Building & Repair Co., Philadelphia

No. 31.....	American Owners .....	Freight .....	560	.....	.....	.....	.....
-------------	-----------------------	---------------	-----	-------	-------	-------	-------

##### Fore River Ship Building Corporation, Quincy, Mass.

Julia Luckenbach...	Luckenbach Steamship Co.....	Freight .....	8,150	12	456.4 x 57.0 x 41.6	.....	.....
Mielero .....	Cuba Distilling Co.....	Molasses .....	5,788	10½	406.0 x 54.5 x 32.5	.....	.....
Pennsylvania .....	Texas Steamship Co.....	Oil carrier..	6,678	11	431.9 x 56.0 x 32.8	.....	.....
Virginia .....	Texas Steamship Co.....	Oil carrier..	6,678	11	431.9 x 56.0 x 32.8	.....	Feb., '17
Ingeniero Luis and Huergo .....	Argentine Republic .....	Oil carrier..	3,400	10½	.....	.....	May, '17
K. I. Luckenbach...	Luckenbach Steamship Co.....	Freight .....	8,150	13	459.0 x 55.9 x 40.7	.....	Feb., '17
F. J. Luckenbach...	Luckenbach Steamship Co.....	Freight .....	8,150	13	459.0 x 55.9 x 40.7	.....	Mar., '17
Katrina Luckenbach	Luckenbach Steamship Co.....	Freight .....	8,150	13	459.0 x 55.9 x 40.7	.....	June, '17
No. 272.....	.....	Freight .....	5,700	10½	.....	.....	Aug., '17
No. 273.....	.....	Freight .....	5,700	10½	.....	.....	Sept., '17

##### Harlan & Hollingsworth Corporation, Wilmington, Del.

Benjamin Brewster.	Standard Oil Co. of N. J.....	Oil carrier..	5,614	10½	427.0 x 53.5 x 31.0	2,550	..... '17
W. H. Telford.....	Standard Oil Co. of N. J.....	Oil carrier..	5,614	10½	427.0 x 53.5 x 31.0	2,550	..... '17
O. T. Waring.....	Standard Oil Co. of N. J.....	Oil carrier..	5,614	10½	427.0 x 53.5 x 31.0	2,550	..... '17
J. A. Bostwick.....	Standard Oil Co. of N. J.....	Oil carrier..	8,490	10½	465.6 x 60.0 x 36.3	3,000	..... '17
Olean .....	Vacuum Oil Co.....	Freight .....	2,750	10	312.0 x 45.0 x 26.6	1,400	..... '17
Hiram B. Everest..	Vacuum Oil Co.....	Oil carrier..	5,614	10½	427.0 x 53.5 x 31.0	2,700	..... '17
Stony Point.....	W. & A. Fletcher Co.....	Ferry boat..	1,404	.....	210.0 x 66.2 x 17.5	.....	..... '17
Hull 450.....	Ocean Steamship Co.....	Pass. & Frt.	6,700	12½	435.0 x 53.0 x 35.0	3,000	..... '18
Hull 451.....	Ocean Steamship Co.....	Pass. & Frt.	6,700	12½	435.0 x 53.0 x 35.0	3,000	..... '18
Hull 453.....	United Fruit Co.....	Freight .....	3,070	10	322.0 x 48.0 x 24.0	1,650	..... '17
Hull 454.....	United Fruit Co.....	Freight .....	3,070	10	322.0 x 48.0 x 24.0	1,650	..... '17
Hull 455.....	United Fruit Co.....	Freight .....	3,070	10	322.0 x 48.0 x 24.0	1,650	..... '18
Hull 456.....	United Fruit Co.....	Freight .....	3,070	10	322.0 x 48.0 x 24.0	1,650	..... '18

##### Merrill-Stevens Co., Jacksonville, Fla.

No. 89.....	Gulf & Southern Steamship Co.....	Freight .....	1,700	10	.....	.....	..... '17
No. 90.....	Cuba Distilling Co.....	Freight .....	250	7	.....	.....	..... '17
No. 92.....	Boston Molasses Co.....	Molasses .....	300	7	.....	.....	Jan., '17
No. 91.....	Cuba Distilling Co.....	Freight .....	250	7	.....	.....	..... '17

##### Newport News Ship Building & Dry Dock Co., Newport News, Va.

William G. Warden.	Standard Oil Co.....	Oil carrier..	10,900	10½	.....	3,000	.....
F. O. Baretow.....	Standard Oil Co.....	Oil carrier..	10,900	10½	.....	3,000	.....
Felix Taussig.....	Crowell & Thurlow Steamship Co.....	Freight .....	6,256	10	.....	2,200	.....
.....	Munson Steamship Line.....	Freight .....	4,600	10½	.....	2,200	Dec., '17
O. B. Jennings.....	Standard Oil Co.....	Oil carrier..	10,900	10½	.....	3,000	.....
Torres .....	Southern Pacific Co.....	Oil carrier..	5,125	11	.....	2,300	.....
El Almirante .....	Southern Pacific Co.....	Freight .....	4,500	11	.....	2,200	.....
El Capitan .....	Southern Pacific Co.....	Freight .....	4,500	11	.....	2,200	.....
.....	Atlantic Refining Co.....	Oil carrier..	10,900	10½	.....	3,000	.....



**Table II**  
(Continued)  
**Merchant Tonnage Building Jan. 1, 1917**  
**Atlantic Coast Ship Yards**  
(Continued)

Newport News Ship Building & Dry Dock Co., Newport News, Va. (Concluded)

Name or Yard No.	Owner.	Type	Gross tonnage.	Speed, knots.	Length, Breadth and Depth, feet.	I. H. P.	If not launched give probable date.
.....	Munson Steamship Line.....	Freight ....	4,600	10½	.....	.....	.....
.....	Munson Steamship Line.....	Freight ....	4,600	11	.....	.....	.....
H. M. Flagler.....	Standard Oil Co.....	Oil carrier..	8,374	.....	.....	.....	.....
.....	Standard Oil Co.....	Oil carrier..	8,374	.....	.....	.....	.....
<b>New York Ship Building Co., Camden, N. J.</b>							
190 .....	Petroleum Transportation Co.....	Oil carrier..	7,794	11	468.0 x 62.5 x 39.5	3,200	Winter, '17
191 .....	Darrow-Mann Co. ....	Collier ....	5,266	10½	377.4 x 55.0 x 34.5	2,500	Fall, '17
192 .....	Darrow-Mann Co. ....	Collier ....	5,266	10½	377.4 x 55.0 x 34.5	2,500	Fall, '17
193 .....	East Coast Transportation Co.....	Lumber Str.	5,000	11	361.9 x 51.0 x 30.0	2,150	Spring, '18
195 .....	Darrow-Mann Co. ....	Collier ....	5,266	10½	377.4 x 55.0 x 34.5	2,500	Fall, '17
196 .....	Gulf Refining Co. ....	Oil carrier..	6,770	11½	419.3 x 56.3 x 33.4	3,200	Spring, '18
Edw. L. Doheny, Jr.	Petroleum Transportation Co.....	Oil carrier..	7,794	11	468.0 x 62.5 x 39.5	3,200	Spring, '17
Gulfmaid .....	Gulf Refining Co. ....	Oil carrier..	5,188	11½	391.6 x 51.0 x 30.2	2,650	Spring, '17
Gulf of Mexico.....	Gulf Refining Co. ....	Oil carrier..	7,794	11	468.0 x 62.5 x 39.5	3,200	Spring, '17
Sylvan Arrow .....	Standard Transportation Co.....	Oil carrier..	7,794	11	468.0 x 62.5 x 39.5	3,200	Spring, '17
Broad Arrow .....	Standard Transportation Co.....	Oil carrier..	7,794	11	468.0 x 62.5 x 39.5	3,200	Spring, '17
Deepwater .....	Darrow-Mann Co. ....	Collier ....	8,500	10½	437.0 x 63.5 x 37.3	3,200	Spring, '17
Tidewater .....	Darrow-Mann Co. ....	Collier ....	5,266	10½	377.4 x 55.0 x 34.5	2,500	Winter, '16
182 .....	Coastwise Transportation Co.....	Collier ....	5,266	10½	377.4 x 55.0 x 34.5	2,500	Spring, '17
183 .....	Pocahontas Navigation Co.....	Collier ....	3,289	10½	319.3 x 49.3 x 27.5	1,800	Summer, '17
Sewall's Point.....	Darrow-Mann Co. ....	Collier ....	5,266	10½	377.4 x 55.0 x 34.5	2,500	Summer, '17
185, 186, 187, 188..	New York Central Railroad.....	Car floats..	*3,040	.....	265.0 x 40.0 x 10.0	.....	Summer, '17
Gulfland .....	Gulf Refining Co. ....	Oil carrier..	5,188	11½	391.6 x 51.0 x 30.2	2,650	Fall, '17

\*Aggregate tonnage.

**Pennsylvania Ship Building Co., Gloucester, N. J.**

No. 1.....	Norwegian Account .....	Oil carrier..	5,000	11	.....	.....	.....
No. 2.....	Norwegian Account .....	Oil carrier..	5,000	11	.....	.....	.....
No. 3.....	Norwegian Account .....	Oil carrier..	5,000	11	.....	.....	.....
No. 4.....	Norwegian Account .....	Oil carrier..	5,000	11	.....	.....	.....
No. 5.....	Norwegian Account .....	Oil carrier..	5,000	11	.....	.....	.....
No. 6.....	Norwegian Account .....	Oil carrier..	5,000	11	.....	.....	.....
No. 7.....	Norwegian Account .....	Freight ....	8,750	11	.....	.....	.....
No. 8.....	Norwegian Account .....	Freight ....	8,750	11	.....	.....	.....
No. 9.....	Norwegian Account .....	Freight ....	8,750	11	.....	.....	.....
No. 10.....	Norwegian Account .....	Freight ....	8,750	11	.....	.....	.....

**Pusey & Jones Co., Wilmington, Del.**

Nokomis .....	.....	Yacht .....	750	.....	243.0 x 31.9 x 19.8	2,000	.....
No. 1336.....	Christoffer Hannevig .....	Aux. Schr..	300	.....	125.0 x 28.0 x 15.0	120	.....
No. 1336.....	Christoffer Hannevig .....	Aux. Schr..	300	.....	125.0 x 28.0 x 15.0	120	.....
No. 1336.....	Christoffer Hannevig .....	Aux. Schr..	300	.....	125.0 x 28.0 x 15.0	120	.....
No. 1336.....	Christoffer Hannevig .....	Aux. Schr..	300	.....	125.0 x 28.0 x 15.0	120	.....
No. 1337.....	Christoffer Hannevig .....	Freight ....	1,600	.....	300.0 x 44.0 x 22.3	1,400	.....
No. 1337.....	Christoffer Hannevig .....	Freight ....	1,600	.....	300.0 x 44.0 x 22.3	1,400	.....
No. 1337.....	Christoffer Hannevig .....	Freight ....	1,600	.....	300.0 x 44.0 x 22.3	1,400	.....
No. 1337.....	Christoffer Hannevig .....	Freight ....	1,600	.....	300.0 x 44.0 x 22.3	1,400	.....
No. 1337.....	Christoffer Hannevig .....	Freight ....	1,600	.....	300.0 x 44.0 x 22.3	1,400	.....
No. 1337.....	Christoffer Hannevig .....	Freight ....	1,600	.....	300.0 x 44.0 x 22.3	1,400	.....

**Riter-Conley Mfg. Co., Baltimore, Md.**

.....	Gulf Refining Co.....	Oil carrier..	1,500	.....	.....	.....	July, '17
.....	Gulf Refining Co.....	Oil carrier..	1,500	.....	.....	.....	Sept., '17

**Spedden Ship Building Co., Baltimore**

John T. Donohue...	Northern Transportation Co.....	Towing ....	235	.....	.....	.....	.....
Northern .....	Northern Transportation Co.....	Towing ....	425	.....	.....	.....	.....

**Standard Ship Building Corporation, New York City**

No. 1.....	Norwegian Account .....	Freight ....	4,800	10½	392.5 x 52.0 x 23.8	2,500	.....
No. 2.....	Norwegian Account .....	Freight ....	4,800	10½	392.5 x 52.0 x 23.8	2,500	.....
No. 3.....	Norwegian Account .....	Freight ....	4,800	10½	392.5 x 52.0 x 23.8	2,500	.....
No. 4.....	Norwegian Account .....	Freight ....	4,800	10½	392.5 x 52.0 x 23.8	2,500	.....
No. 5.....	Norwegian Account .....	Freight ....	4,800	10½	392.5 x 52.0 x 23.8	2,500	.....
No. 6.....	Norwegian Account .....	Freight ....	4,800	10½	392.5 x 52.0 x 23.8	2,500	.....
No. 7.....	Norwegian Account .....	Freight ....	4,800	10½	392.5 x 52.0 x 23.8	2,500	.....
No. 8.....	Norwegian Account .....	Freight ....	4,800	10½	392.5 x 52.0 x 23.8	2,500	.....

**Staten Island Ship Building Co., Port Richmond, N. Y.**

Hull 688.....	Clinchfield Navigation Co.....	Freight ....	2,100	.....	274.0 x 42.0 x 24.0	.....	'17
Hull 689.....	Clinchfield Navigation Co.....	Freight ....	2,100	.....	274.0 x 42.0 x 24.0	.....	'17
Hull 692.....	Clinchfield Navigation Co.....	Freight ....	2,100	.....	274.0 x 42.0 x 24.0	.....	'17
Hull 693.....	Clinchfield Navigation Co.....	Freight ....	2,100	.....	274.0 x 42.0 x 24.0	.....	'17
Hull 694.....	Builder's Account .....	Freight ....	2,100	.....	274.0 x 42.0 x 24.0	.....	.....
Hull 695.....	Builder's Account .....	Freight ....	2,100	.....	274.0 x 42.0 x 24.0	.....	.....

**Sun Ship Building Co., Chester, Pa.**

No. 1.....	Sun Co. ....	Oil carrier..	7,100	10½	.....	.....	Nov., '17
No. 2.....	Sun Co. ....	Oil carrier..	7,100	10½	.....	.....	Nov., '17

**Tampa Foundry & Machine Co., Tampa, Fla.**

Not named.....	Central Hudson Steamboat Co.....	.....	2,000	.....	.....	.....	.....
----------------	----------------------------------	-------	-------	-------	-------	-------	-------

**Tank-Ship Building Corporation, Newburgh, N. Y.**

25 vessels.....	Tampico Navigation Co.....	Barges .....	*27,500	.....	165.4 x 37.8 x 8.9	.....	.....
Not named.....	.....	Oil carrier..	5,000	.....	430.0 x 56.1 x 32.8	.....	.....
Not named.....	.....	Oil carrier..	5,000	.....	430.0 x 56.1 x 32.8	.....	.....

\*Aggregate tonnage.



## Table II

(Continued)

### Merchant Tonnage Building Jan. 1, 1917

#### Atlantic Coast Ship Yards

(Concluded)

Texas Steamship Co., Bath, Me.

Name or Yard No.	Owner.	Type	Gross tonnage.	Speed, knots.	Length, Breadth and Depth, feet.	I. H. P.	If not launched give probable date.
No. 1.....	Builder's Account	Oil carrier..	6,300	11	.....	.....	Mar., '17
No. 2.....	Builder's Account	Oil carrier..	6,300	11	.....	.....	May, '17
No. 3.....	Builder's Account	Oil carrier..	6,700	11	.....	.....	Oct., '17
No. 4.....	Builder's Account	Oil carrier..	6,700	11	.....	.....	Dec., '17

#### Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia

Hull 434.....	Atlantic, Gulf & West Indies Steamship Co.	Pass. & Frt.	8,000	17	425.0 x 59.0 x 36.0	9,000	..... '17
Hull 435.....	Atlantic, Gulf & West Indies Steamship Co.	Pass. & Frt.	8,000	17	425.0 x 59.0 x 36.0	9,000	..... '17
Santa Rosa.....	W. R. Grace & Co.	Freight	6,620	12	404.5 x 53.8 x 36.8	3,000	..... '17
Santa Paula.....	W. R. Grace & Co.	Freight	6,620	12	404.5 x 53.8 x 36.8	3,000	..... '17
Harold Walker.....	Pan-American Petroleum & Transportation Co.	Oil carrier..	6,485	11	430.0 x 58.0 x 33.4	2,800	..... '17
William Green.....	Pan-American Petroleum & Transportation Co.	Oil carrier..	6,485	12	430.0 x 58.0 x 33.4	2,800	..... '17
Santa Anna.....	W. R. Grace & Co.	Pass. & Frt.	5,800	13	360.0 x 51.5 x 33.5	3,200	..... '17
Santa Lucia.....	W. R. Grace & Co.	Pass. & Frt.	5,800	13	360.0 x 51.5 x 33.5	3,200	..... '17

### Great Lakes Ship Yards

#### American Ship Building Co., Cleveland

No. 716.....	Pittsburgh Steamship Co.	Bulk Ftr.	7,700	10	600.0 x 60.0 x 32.0	2,000	..... '17
No. 718.....	Carl D. Bradley	Bulk Ftr.	7,800	10	600.0 x 60.0 x 32.0	2,000	..... '17
No. 719.....	Pittsburgh Steamship Co.	Bulk Ftr.	7,700	10	600.0 x 60.0 x 32.0	2,000	..... '17
No. 720.....	Pittsburgh Steamship Co.	Bulk Ftr.	7,700	10	600.0 x 60.0 x 32.0	2,000	..... '17
No. 721.....	M. A. Hanna & Co.	Bulk Ftr.	6,400	11	545.0 x 58.0 x 31.0	1,800	..... '17
No. 722.....	M. A. Hanna & Co.	Bulk Ftr.	6,400	11	545.0 x 58.0 x 31.0	1,800	..... '17
No. 723.....	M. A. Hanna & Co.	Bulk Ftr.	6,400	11	545.0 x 58.0 x 31.0	1,800	..... '17
No. 203.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 204.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 205.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 206.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 207.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 208.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 525.....	James E. Davidson	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 526.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 527.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 528.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 529.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 81.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 82.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 83.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 84.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 463.....	Barber & Co., Inc.	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 464.....	Barber & Co., Inc.	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 465.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17
No. 466.....	.....	Freight	2,100	9½	261.0 x 43.5 x 20.0	1,100	..... '17

#### Great Lakes Engineering Works, Detroit, Mich

No. 158.....	Clyde Steamship Co.	Freight	2,100	10	261.0 x 43.0 x 29.8	1,100	.....
No. 160.....	Adler, Incorporated	Collier	2,100	10	261.0 x 43.5 x 27.5	1,100	.....
No. 161.....	Argentine Government	Oil carrier..	2,100	10	261.0 x 43.5 x 27.5	1,100	.....
No. 163.....	Clinchfield Navigation Co.	Collier	2,100	10	261.0 x 43.0 x 29.8	1,100	.....
No. 165.....	Clinchfield Navigation Co.	Collier	2,100	10	261.0 x 43.0 x 29.8	1,100	.....
No. 164.....	Cleveland-Cliffs Iron Co.	Bulk Ftr.	7,700	10	600.0 x 60.0 x 32.0	2,000	.....
No. 166.....	Buffalo Steamship Co.	Bulk Ftr.	7,700	10	600.0 x 60.0 x 32.0	2,000	.....
No. 167.....	Buffalo Steamship Co.	Bulk Ftr.	7,700	10	600.0 x 60.0 x 32.0	2,000	.....
No. 168.....	.....	Freight	3,700	.....	.....	.....	.....
No. 169.....	.....	Freight	3,700	.....	.....	.....	.....

#### Toledo Ship Building Co., Toledo, O.

Horace S. Wilkinson	Great Lakes Steamship Co.	Bulk Ftr.	7,700	11	600.0 x 60.0 x 32.0	2,000	April, '17
No. 138.....	Arthur R. Lewis	Freight	1,800	10	261.0 x 43.5 x 21.0	1,250	May, '17
No. 139.....	Arthur R. Lewis	Freight	1,800	10	261.0 x 43.5 x 21.0	1,250	June, '17
No. 140.....	Arthur R. Lewis	Freight	1,800	10	261.0 x 43.5 x 21.0	1,250	July, '17
No. 141.....	Arthur R. Lewis	Freight	1,800	10	261.0 x 43.5 x 21.0	1,250	Aug., '17
No. 142.....	Arthur R. Lewis	Freight	1,800	10	261.0 x 43.5 x 21.0	1,250	Sept., '17
No. 143.....	Arthur R. Lewis	Freight	1,800	10	261.0 x 43.5 x 21.0	1,250	Oct., '17

#### Manitowoc Ship Building Co., Manitowoc, Wis.

No. 85.....	Bay State Fishing Co.	Trawler	303	10	135.0 x 22.5 x 14.3	600	Mar., '17
No. 89.....	Bay State Fishing Co.	Trawler	303	10	135.0 x 22.5 x 14.3	600	May, '17
No. 80.....	Berg Hansen Co.	Freight	2,500	9	251.0 x 43.5 x 23.0	640	Mar., '17
No. 81.....	Berg Hansen Co.	Freight	2,500	9	251.0 x 43.5 x 23.0	640	Mar., '17
No. 82.....	C. Hannevig	Freight	2,250	9	251.0 x 43.5 x 20.0	1,300	Apr., '17
No. 83.....	C. Hannevig	Freight	2,250	9	251.0 x 43.5 x 20.0	1,300	June, '17
No. 86.....	R. L. Smith	Freight	2,250	9	251.0 x 43.5 x 20.0	1,300	Sept., '17
No. 87.....	C. Hannevig	Freight	2,250	9	251.0 x 43.5 x 20.0	1,300	Mar., '18
No. 88.....	C. Hannevig	Freight	2,250	9	251.0 x 43.5 x 20.0	1,300	Mar., '18

### Pacific Coast Ship Yards

#### Anderson Steamboat Co., Seattle, Wash.

.....	Hannevig Brothers	Freight	5,700	10½	.....	.....	.....
.....	Hannevig Brothers	Freight	5,700	10½	.....	.....	.....



## Table II

(Continued)

### Merchant Tonnage Building Jan. 1, 1917

#### Pacific Coast Ship Yards

(Concluded)

J. F. Duthie & Co., Seattle, Wash.

Name or Yard No.	Owner.	Type	Gross tonnage.	Speed, knots.	Length, Breadth and Depth, feet.	I. H. P.	If not launched give probable date.
No. 8.....	Norwegian Account	Freight	5,730	10½	.....	2,500	June, '17
No. 9.....	Norwegian Account	Freight	5,730	10½	.....	2,500	July, '17
No. 10.....	Norwegian Account	Freight	5,730	10½	.....	2,500	Aug., '17
No. 11.....	Norwegian Account	Freight	5,730	10½	.....	2,500	Sept., '17
No. 12.....	Norwegian Account	Freight	5,730	10½	.....	2,500	Dec., '17
No. 13.....	Norwegian Account	Freight	5,730	10½	.....	2,500	Nov., '17
No. 14.....	Norwegian Account	Freight	5,730	10½	.....	2,500	Dec., '17
No. 15.....	Norwegian Account	Freight	5,730	10½	.....	2,500	Dec., '17

#### Moore & Scott Iron Works, Oakland, Cal.

Capto .....	B. Stolt Nielsen.....	Freight	5,000	.....	376.0 x 52.3 x 28.0	2,400	*Jan., '17
Thordis .....	O. T. Tonnevald.....	Freight	5,000	.....	376.0 x 52.3 x 28.0	2,400	*Jan., '17
No. 111.....	Pan-American Petroleum & Transportation Co. ....	Oil carrier..	6,000	11	425.0 x 57.0 x 33.0	2,600	*June 30, '17
No. 112.....	Hannevig Bros. ....	Freight	5,000	.....	376.0 x 52.3 x 28.0	2,400	*Oct. 28, '17
No. 113.....	Christen Christensen .....	Freight	5,500	.....	402.5 x 53.0 x 26.5	2,400	*Feb. 1, '18
No. 114.....	B. A. Sanne.....	Freight	5,500	.....	402.5 x 53.0 x 26.5	2,400	*Mar. 1, '18
No. 115.....	William Hansen .....	Freight	5,500	.....	402.5 x 53.0 x 26.5	2,400	*Mar. 1, '18

\*To be delivered.

#### Seattle Construction & Dry Dock Co., Seattle, Wash.

No. 88.....	Foreign Owners .....	Freight	4,700	10½	396.0 x 53.0 x 29.3	2,500	..... '17
No. 89.....	Foreign Owners .....	Freight	4,700	10½	396.0 x 53.0 x 29.3	2,500	..... '17
No. 90.....	Foreign Owners .....	Freight	4,700	10½	396.0 x 53.0 x 29.3	2,500	..... '17
Walter A. Luckenbach	Edgar F. Luckenbach.....	Freight	8,250	14	469.0 x 55.9 x 40.8	5,000	..... '17
No. 92.....	Foreign Owners .....	Freight	4,700	10½	396.0 x 53.0 x 29.3	2,500	..... '17
No. 93.....	Foreign Owners .....	Freight	4,700	10½	396.0 x 53.0 x 29.3	2,500	..... '17
No. 94.....	Foreign Owners .....	Freight	4,700	10½	396.0 x 53.0 x 29.3	2,500	..... '17
No. 95.....	Foreign Owners .....	Freight	4,700	10½	396.0 x 53.0 x 29.3	2,500	..... '17
No. 96.....	Barber & Co. ....	Freight	4,700	10½	396.0 x 53.0 x 29.3	2,500	..... '18

#### Skinner & Eddy Corporation, Seattle, Wash.

Louisa Nielsen.....	B. Stolt Nielsen.....	Freight	5,730	11½	410.5 x 54.0 x 29.8	2,500	July, '17
Stolt Nielsen.....	B. Stolt Nielsen.....	Freight	5,730	11½	410.5 x 54.0 x 29.8	2,500	Aug., '17
S. V. Harkness.....	Standard Oil Co. of N. J. ....	Oil carrier..	6,400	10½	420.0 x 57.0 x 31.5	2,500	Feb., '17
Josiah Macy.....	Standard Oil Co. of N. J. ....	Oil carrier..	6,400	10½	420.0 x 57.0 x 31.5	2,500	May, '17
No. 8.....	Norwegian Account .....	Freight	5,730	11½	410.5 x 54.0 x 29.8	2,500	.....
No. 9.....	Norwegian Account .....	Freight	5,730	11½	410.5 x 54.0 x 29.8	2,500	.....
No. 10.....	Norwegian Account .....	Freight	5,730	11½	410.5 x 54.0 x 29.8	2,500	.....
No. 11.....	Standard Oil Co. of N. J. ....	Oil carrier..	6,400	10½	420.0 x 57.0 x 31.5	2,500	.....
No. 12.....	Norwegian Account .....	Freight	5,730	11½	410.5 x 54.0 x 29.8	2,500	.....
No. 14.....	Norwegian Account .....	Freight	5,730	11½	410.5 x 54.0 x 29.8	2,500	.....

#### Union Iron Works Co., San Francisco

Southerner .....	F. Strachan .....	Freight	6,115	10½	410.0 x 56.0 x 33.5	2,400	Feb., '17
Hull 133.....	Hind, Rolph Co. ....	Freight	6,115	10½	410.0 x 56.0 x 33.5	2,400	Feb., '17
Fred W. Weller.....	Standard Oil Co. of New Jersey.....	Oil carrier..	10,500	10½	500.0 x 68.0 x 38.0	3,200	Feb., '17
A. C. Bedford.....	Standard Oil Co. of New Jersey.....	Oil carrier..	10,500	10½	500.0 x 68.0 x 38.0	3,200	Mar., '17
Tiger .....	Standard Transportation Co. of Delaware	Oil carrier..	6,115	10½	410.0 x 56.0 x 33.5	2,600	Jan., '17
Eagle .....	Standard Transportation Co. of Delaware	Oil carrier..	6,115	10½	410.0 x 56.0 x 33.5	2,600	Feb., '17
No. 139.....	Christen Smith .....	Freight	6,115	10½	410.0 x 56.0 x 33.5	2,600	Jan., '17
No. 140.....	Wilhelm Jebson .....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	June, '17
No. 141.....	Petroleum Transportation Co. ....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	April, '17
No. 142.....	.....	Freight	6,115	10½	410.0 x 56.0 x 33.5	2,600	.....
No. 143.....	Atlantic Oils Refining Co. ....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	July, '17
No. 144.....	Atlantic Oils Refining Co. ....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	July, '17
No. 145.....	Pan-American Petroleum & Transportation Co. ....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	Aug., '17
No. 146.....	Pan-American Petroleum & Transportation Co. ....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	Sept., '17
No. 147.....	.....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	.....
No. 148.....	Atlantic Oils Refining Co. ....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	June, '17
No. 149.....	Atlantic Oils Refining Co. ....	Oil carrier..	7,445	10½	435.0 x 56.0 x 33.5	2,600	July, '17
No. 150.....	.....	Freight	6,115	10½	410.0 x 56.0 x 33.5	2,600	May, '17
No. 151.....	.....	Freight	6,115	10½	410.0 x 56.0 x 33.5	2,600	June, '17
No. 153.....	.....	Freight	6,115	10½	410.0 x 56.0 x 33.5	2,600	Oct., '17
No. 154.....	A. O. Lindvig.....	Freight	3,600	10½	341.0 x 48.0 x 27.3	1,600	.....
No. 16.....	C. Henry Smith & Co. ....	Freight	3,600	10½	341.0 x 48.0 x 27.3	1,600	.....
No. 17.....	Willy Gilbert .....	Freight	3,600	10½	341.0 x 48.0 x 27.3	2,400	Mar., '17

#### Williamette Iron & Steel Works and Northwest Steel Co., Portland, Ore.

Lauritz Kloster.....	Lauritz Kloster .....	Freight	5,700	10½	.....	.....	Jan., '17
Ellen Kloster.....	Lauritz Kloster .....	Freight	5,700	10½	.....	.....	Mar., '17
Peder Kleppe.....	Peder Kleppe .....	Freight	5,700	10½	.....	.....	June, '17
Willy Gilbert.....	Willy Gilbert .....	Freight	5,700	10½	.....	.....	Sept., '17
John Erland.....	John Erland .....	Freight	5,700	10½	.....	.....	April, '17
.....	Norwegian Account .....	Freight	5,700	10½	.....	.....	Winter, '17
.....	Norwegian Account .....	Freight	5,700	10½	.....	.....	Winter, '17
.....	Norwegian Account .....	Freight	5,700	10½	.....	.....	.....

#### Inland River Ship Yards

American Bridge Co., New York

*Six .....	.....	Log barges..	\$2,280	.....	.....	Ohio river
*Six .....	American Steel & Wire Co. ....	Coal barges..	\$1,296	.....	.....	Monongahela river
*Seventy .....	Carnegie Steel Co. ....	Coal barges..	\$35,840	.....	.....	Monongahela river



## Table II

(Concluded)

### Merchant Tonnage Building Jan. 1, 1917

#### Inland River Ship Yards

(Concluded)  
American Bridge Co. (Concluded)

Name or Yard No.	Owner.	Type	Gross tonnage.	Speed, knots.	Length, Breadth and Depth, feet.	I. H. P.	If not launched give probable date.
*Two .....	.....	Ore barges...	3,000	.....	.....	.....	Mississippi river
*Three .....	Lehigh Valley Railroad.....	Car floats...	1,500	.....	.....	.....	New York harbor
*Two .....	Lehigh Valley Railroad.....	Car floats...	1,700	.....	.....	.....	New York harbor
*One .....	Lehigh Valley Railroad.....	Car floats...	1,100	.....	.....	.....	New York harbor
*Two .....	New York, Philadelphia & Norfolk Railroad	Car floats...	1900	.....	.....	.....	Norfolk, Va.
*Number of vessels. †Aggregate tonnage. ‡Service.							

#### Dubuque Boat & Boiler Works, Dubuque, Ia.

No. 39.....	Standard Oil Co.....	Oil carrier..	1,350	.....	.....	.....	June 1, '17
-------------	----------------------	---------------	-------	-------	-------	-------	-------------

#### Howard Ship Yards Co., Jeffersonville, Ind.

.....	Baton Rouge Transportation Co.....	Ferry .....	500	8½	.....	.....	.....
.....	Union Ferry Co.....	Ferry .....	550	8½	.....	.....	.....
.....	Union Ferry Co.....	Ferry .....	500	8½	.....	.....	.....
.....	Amesville Ferry Co.....	Ferry .....	500	8½	.....	.....	.....
.....	Louisville & Jeffersonville Ferry Co.....	Passenger ..	900	10	.....	.....	.....

## Vessels Building for U. S. Navy

			Per cent of completion. Dec. 1, 1916.					Per cent of completion. Dec. 1, 1916.	
No. and name of vessel.			Total.	On ship.	No. and name of vessel.			Total.	On ship.
<b>Battleships</b>					<b>Submarines</b>				
40	New Mexico	New York Navy Yard.....	55.2	46.7	44	L-5 .....	Lake T. B. Co., Bridgeport....	88.7	88.6
41	Mississippi	Newport News S. B. Co.....	63.4	57.1	45	L-6 .....	Lake T. B. Co., Lg. B'ch, Cal.	86.1	85.4
42	Idaho	New York S. B. Co.....	66.7	63.4	46	L-7 .....	Lake T. B. Co., Lg. B'ch, Cal.	85.9	85.3
43	Tennessee	New York Navy Yard.....	3.5	.....	47	M-1 .....	Electric Boat Co., Quincy.....	99.4	99.4
44	California	Mare Island Navy Yard.....	7.4	1.3	48	L-8 .....	Portsmouth, N. H., Navy Yard	92.3	91.1
					52	Schley .....	Electric Boat Co., Quincy.....	31.1	22.1
					53	N-1 .....	Electric Boat Co., Seattle.....	78.8	70.4
					54	N-2 .....	Electric Boat Co., Seattle.....	74.8	64.1
					55	N-3 .....	Electric Boat Co., Seattle.....	69.7	58.7
					56	N-4 .....	Lake T. B. Co., Bridgeport....	82.0	78.7
					57	N-5 .....	Lake T. B. Co., Bridgeport....	75.4	69.9
					58	N-6 .....	Lake T. B. Co., Bridgeport....	73.7	68.0
					59	N-7 .....	Lake T. B. Co., Bridgeport....	73.2	67.0
					60	— .....	Electric Boat Co., Quincy.....	7.2	.....
					61	— .....	Electric Boat Co., Quincy.....	7.2	.....
					62	O-1 .....	Portsmouth, N. H., Navy Yard	.....	.....
					63	O-2 .....	Puget Sound Navy Yard.....	.....	.....
					64	O-3 .....	Electric Boat Co., Quincy.....	27.9	14.6
					65	O-4 .....	Electric Boat Co., Quincy.....	27.9	14.6
					66	O-5 .....	Electric Boat Co., Quincy.....	27.8	14.5
					67	O-6 .....	Electric Boat Co., Quincy.....	27.8	14.5
					68	O-7 .....	Electric Boat Co., Quincy.....	27.8	14.5
					69	O-8 .....	Electric Boat Co., Quincy.....	27.4	14.1
					70	O-9 .....	Electric Boat Co., Quincy.....	27.4	14.1
					71	O-10 .....	Electric Boat Co., Quincy.....	27.4	14.1
					72	O-11 .....	Lake T. B. Co., Bridgeport....	40.6	33.0
					73	O-12 .....	Lake T. B. Co., Bridgeport....	39.7	31.9
					74	O-13 .....	Lake T. B. Co., Bridgeport....	38.7	30.9
					75	O-14 .....	Cal. S. B. Co., Lg. Beach, Cal.	30.1	19.6
					76	O-15 .....	Cal. S. B. Co., Lg. Beach, Cal.	29.3	18.7
					77	O-16 .....	Cal. S. B. Co., Lg. Beach, Cal.	29.5	18.7
<b>Miscellaneous</b>									
Bridge (Supply Ship No. 1)...			89.4	88.5					
Henderson (Transport No. 1)...			93.0	92.0					
Gunboat No. 21			.....	.....					
Hsp. Ship No. 1			.....	.....					
Phila. Navy Yard.....			.....	.....					
Charleston, S. C. Navy Yard..			.....	.....					
Philadelphia Navy Yard.....			.....	.....					

\*Delivered Nov. 10, 1916.

## Yards Broke Records

(Concluded from page 54)

after the end of the present war. This points to a confidence in the future of American shipping by ship builders themselves and by their bankers. The government's unexampled program of naval construction and the practical pledging of this country to the permanent policy of a great navy, undoubtedly has been an important factor in these calculations for the future. This program provides that 66 warships of 382,000 tons displacement are to be begun as soon as

practicable. This bespeaks a continuation of large contracts in the years to come.

### Faith in the Future

But beyond the government's direct support through naval contracts, substantial faith in the future of the American merchant marine is displayed in the development of these plans for the future. Expert opinion holds that it will require the output of every ship yard for several years after the war to restore the lost tonnage and retrieve the normal increase in the fleets of commerce interrupted

by the clash of arms. If this proves to be the case, the American ship builder should have his chance to thoroughly establish himself before being forced into competition with the world at large. If to this were added reasonable and constructive government support of the American ship owner, a future, rich in promise for the American flag upon the high seas, is assured.

The steamer GEORGETOWN has been sold by the Atlantic Coast Steamship Co., Buffalo, to D. H. E. Jones, of New York City.

# Lake Ship Yards Make Good Record

Build 125 Merchant Vessels in 1916, Having Aggregate Gross Tonnage of 108,235

—Vessels Now Under Construction—Bulk-Freight Carrying Capacity Increases

**D**URING 1916, Great Lakes ship yards built for American owners 125 merchant vessels of 108,235 gross tons. The yards on the Atlantic and gulf coasts built 610 merchant vessels of 312,426 gross tons. Pacific yards built 276 vessels of 93,318 gross tons, while the yards on the western rivers built 152 vessels of 6,868 gross tons. American yards thus built 1,163 merchant vessels of 520,847 gross tons in 1916.

During 1915, Great Lakes ship yards built 159 merchant vessels of 23,320 gross tons. The Atlantic and gulf coast yards built 577 vessels of 164,677 gross tons. Pacific yards built 336 vessels of 24,580 gross tons and western river yards, 144 vessels of 3,025 gross tons. The 1915 total was 1,216 merchant vessels of 215,602 gross tons. The foregoing figures have just been compiled by the bureau of navigation, department of commerce. The 1916 totals do not include 50 vessels of 39,392 gross tons built here for foreign owners.

The increased importance of the lake yards during 1916 is clearly indicated by a comparison of the foregoing figures. In 1915, for instance, lake yards built 159 out of 1,216 vessels completed by all American ship builders, or 13 per cent. In 1916, they built only 125 out of 1,163 vessels, or 10.8 per cent. Taking tonnage figures, however, to secure a more accurate comparison, it is found that the lake yards turned out 23,320 tons of a total of 215,602 tons in 1915, or 10.8 per cent; and 108,235 tons of a total of 520,847 tons in 1916, or 20.8 per cent. While the country's 1916 output showed an increase of 142 per cent of the 1915 production, the increase for the lake yards was 364 per cent of the 1915 production.

The lake yards turned out for American owners in 1916, 79 wooden vessels, of which 10 were designed to use steam, 34 to use gas, and 35 were unrigged. The aggregate tonnage of the wooden vessels was 6,035 gross tons. The metal vessels built on the lakes numbered 46 with an aggregate gross tonnage of 102,200. Of these one was a sailing vessel, 35 were designed to use steam,

six to use gas, and four were unrigged.

The opening of 1917 finds the lake yards facing another year of full activity. Table II, page 57, which gives the vessels under construction in American ship yards on Jan. 1, 1917, shows that lake yards now have under construction 52 vessels of more than 200 gross tons. Included in these are 11 bulk freighters and 37 Welland canal size steamers for the coastwise trade and for foreign owners. These figures do not include Canadian yards.

At the opening of 1916, lake yards were building 36 boats of more than 200 tons gross, including 10 bulk freighters, eight Welland canal size steamers

capacity on record was on Jan. 1, 1912, when the bulk-freighter capacity totaled 3,135,953 gross tons. The number of bulk freighters at the opening of this year was 540, a decrease of six for the year and the smallest number in commission since Jan. 1, 1906. The increase in carrying capacity without any corresponding increase in the total number of vessels merely reflects, of course, the increased capacity of the newer ships.

The seven vessels for the lake trade launched in 1916 compare with one built in 1915; seven built in 1914; four in 1913; five in 1912; five in 1911; 20 in 1910; 17 in 1909; 24 in 1908; 40 in 1907; 40 in 1906; 29 in 1905;

7 in 1904; 42 in 1903, and 32 in 1902. The carrying capacities of these bulk freighters, based

on an average season of 20 trips, are: 1916, 1,640,000 tons; 1915, 200,000 tons; 1914, 1,220,000 tons; 1913, 560,000 tons; 1912, 990,000 tons; 1911, 1,100,000 tons; 1910, 3,890,000 tons; 1909, 3,146,000 tons; 1908, 2,028,000 tons; 1907,

7,360,000 tons; 1906, 7,620,000 tons; 1905, 5,204,000 tons; 1904, 1,026,000 tons; 1903, 4,265,000 tons; 1902, 3,438,000 tons. All of the new vessels for the bulk freight trade on the lakes built since WOLVIN came out in 1904, have been more than 400 feet in length with one exception. Since the appearance of WOLVIN, 38 vessels of the 400-foot class, 114 vessels of the 500-foot class, and 38 vessels of the 600-foot class have been built.

## Takes Over Dry Docks

The dry dock and ship repair plant at Keyport, N. J., formerly owned by Russel Post has been acquired by the Keyport Dry Dock Co., capitalized at \$100,000. The plant has been idle for several months but will be enlarged and put in operation shortly. G. A. Williams, Warwick, N. Y., and W. S. Stuhr and W. Vogt, Hoboken, N. J. control the new company.

The steamer FREDERICK DE BARY, which had been used on the Delaware river during the summer has been sold.

## Great Lakes Bulk Freighters

NUMBER AND CARRYING CAPACITY

Year.	No. of vessels Jan. 1.	Launchings, number.	Subtractions, number.	Carrying capacity, of new vessels, gross tons.	Carrying capacity, subtracted, gross tons.	Total carrying capacity, one trip, gross tons.
1917.....	540	7	13	82,000	45,734	3,109,585
1916.....	546	7	1	10,000	3,104	3,073,319
1915.....	546	1	9	61,000	26,166	3,066,423
1914.....	548	7	28	28,000	120,919	3,031,589
1913.....	572	4	22	49,500	60,945	3,124,508
1912.....	589	5	8	55,000	29,477	3,135,953
1911.....	592	5	17	194,500	60,617	3,108,330
1910.....	589	20	5	157,300	37,197	2,973,447
1909.....	587	17	4	101,400	14,837	2,853,344
1908.....	567	24	16	368,000	46,973	2,766,781
1907.....	542	40	18	381,000	40,987	2,442,754
1906.....	514	40	33	260,200	114,374	2,065,111
1905.....	518	29				1,919,285

for the coastwise trade and seven canals for foreign owners. At the opening of 1915, the new construction on hand included a passenger steamer, three tugs and two dump scows. Only one bulk freighter was built that year, the self-unloader W. F. WHITE.

## Bulk-Freighter Capacity

The accompanying table shows that the total carrying capacity of all of the bulk freighters on the Great Lakes increased from 3,073,319 gross tons on Jan. 1, 1916, to 3,109,585 gross tons on Jan. 1, 1917. The net increase was 36,266 gross tons. Seven bulk freighters for the lake trade were launched during the year, their total carrying capacity being 82,000 gross tons. During the same period, however, 13 vessels were lost to the lakes, three by foundering and 10 through sales to coast interests. These 13 vessels had an aggregate carrying capacity of 45,734 gross tons.

The bulk-freight-carrying capacity at the opening of this year is higher than at any time since Jan. 1, 1913, and has been exceeded only in the years 1912 and 1913. The highest carrying





**A** YEAR ago the builders of wooden ships at north Pacific yards were practically idle; today these same plants are enjoying a period of activity never before experienced in the western section of the maritime world. Twelve months ago the total wooden construction under way consisted of a few small motor vessels. Today the scene is changed. Where there were inactivity and idleness, there are now gangs of skilled workmen laboring at top speed to get together great wooden vessels, many of them sold to foreign owners, and the great majority intended for off-shore trades.

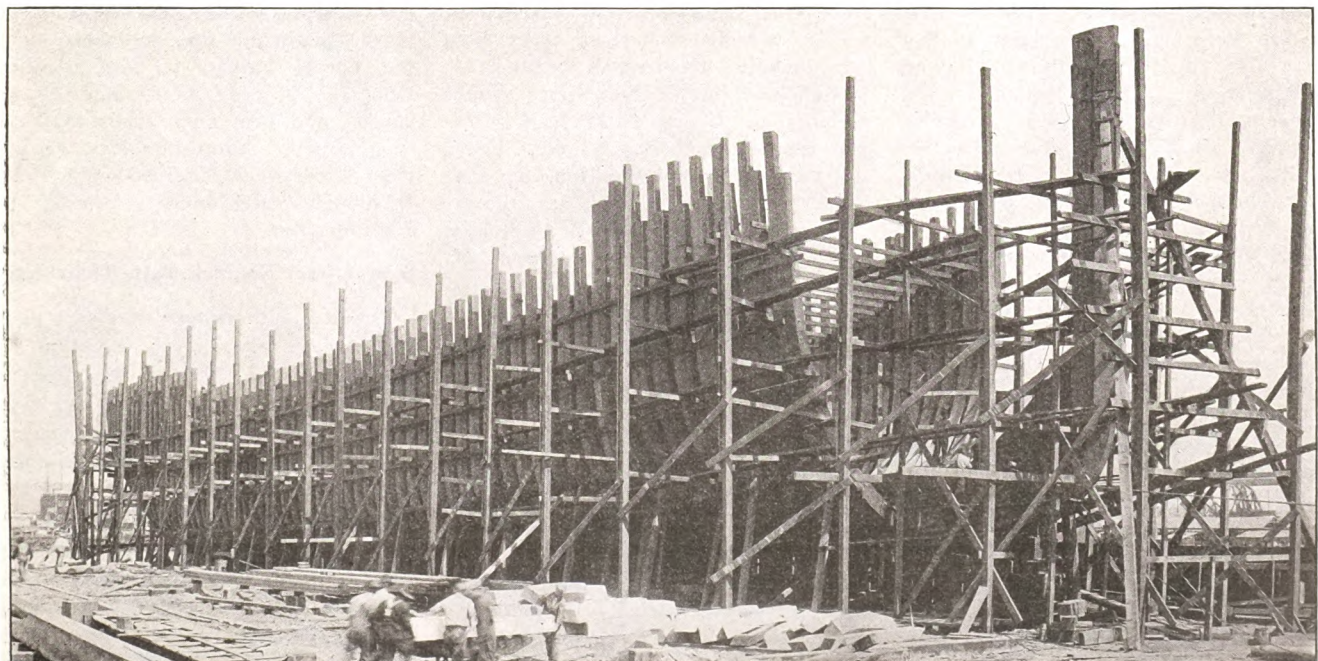
It is a wonderful transformation. A year ago the Pacific coast was envious of the east's prosperity. Today it is sharing that wave of industrial activity to a degree never anticipated. While the construction of steel vessels is also proceeding on high gear on the west coast, that industry lacks the

human interest and the local color which wooden ship building affords. Materials for steel vessels are brought west from the metal centers of the east. Wooden ship building employs the products of home industry—the great, giant trees taken from the wonderful forests of Washington and Oregon. Men go into the deep forests and there pick out tall trees for spars and select logs, from which timbers and lumber are cut for the construction of wooden ships. There is a glamor and a romance to the building of wooden vessels which is lacking in the assembly of steel plates hailing from the east. Consequently, activity in wooden ship building has sent a thrill of life into the lumber industry and allied lines.

The European war, which has created the demand for steel vessels, is likewise responsible for the cry for wooden carriers. Almost over night it has filled the wooden yards with

orders sufficient to keep them occupied for more than a year. Those who have placed their orders early are pleased at their business sagacity while others are clamoring for some one to build for them. Yards on Puget Sound are so rushed with work that delivery on new contracts will not be promised in less than nine months. A contract awarded in November calls for delivery next July.

So insistent is the demand for vessels that Norwegians recently purchased on Puget Sound two wooden four-masted schooners built 15 years ago. The prices they brought are within 15 per cent of their original cost. Two other lumber carriers, of similar type, have been bought by interests in the Gulf of Mexico. Four wooden auxiliary power schooners, which will probably cost less than \$175,000 to complete, have been sold to foreign interests at \$265,000 each and not one of them is yet launched.



AUXILIARY SCHOONER OREGON BUILDING FOR ALASKA-PACIFIC NAVIGATION CO.

*Photo, Webster & Stevens, Seattle.*



The result of this flurry has been the entry into the business of some men who have little knowledge of the building of wooden vessels. New ship yards have sprung up on every hand and numerous others are rumored.

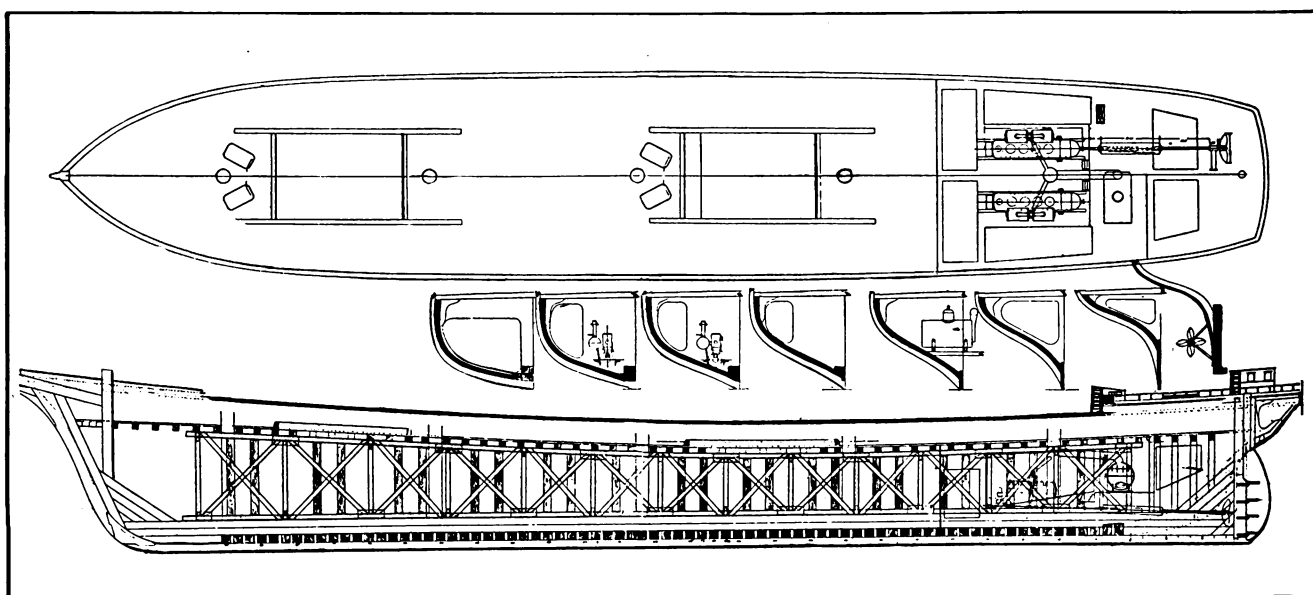
#### Idle Thirteen Years

It is nearly 13 years since the last large wooden sailing schooner was built on the west coast. In the interim, the builders of large wooden vessels have either turned their attention to fishing craft and motor boats or retired from business. Prior to 1904, wooden ship building was in a fairly flourishing state on the Pacific coast. There was a demand largely for four-masted wooden schooners,

schooners which are to have auxiliary steam power. This type is a reversion to the transatlantic vessels of the late sixties, which used sail as well as steam power. In two instances, owners of new tonnage have sent their vessels off shore under sail alone, their object being to profit by the experience of others who have determined upon the internal combustion engine for auxiliary power.

There is a well grounded belief among builders on the west coast that the internal combustion engine is the coming power for vessels engaged in such trades as carrying lumber. Sail will be used wherever possible and power will be called to assist in calms and in inland waters where otherwise towing would be necessary. In a brief

markable supply of the best raw material is giving an impetus to ship building which it otherwise could not have. These trees grow to an unusual size, so that the yards can easily obtain huge timbers for the hulls and great sticks for masts. In proportion to its weight, Douglas fir possesses exceptional strength, making it unusually adaptable for the building of vessels. Its durability, its workability, its small degree of shrinkage, its susceptibility to bending and its ability to take polish and stain are all factors which count strongly in its favor. In fact it is considered an ideal wood for the purpose. Consequently, Pacific ship yards have unlimited supplies of excellent raw material close at hand. Furthermore,



CONSTRUCTION PLAN OF MOTOR SHIP CITY OF PORTLAND

adapted for carrying lumber. Five or six five-masted were built at that time also, these big schooners having a capacity for 1,500,000 feet of lumber, about two-fifths of which is carried on deck. While the lumber exporters built a few barkentines for their trade, the schooner-rigged vessel has been the favorite, although for long off-shore voyages a partly square-rigged vessel usually gives a better account of herself.

A dozen lean years, during which ship owners almost faced bankruptcy, lumber freights being at a starvation ebb, brought an end to the business of building wooden ships of large size on the Pacific. Now it is coming again into its own. While, with one or two exceptions, the tonnage now building or contracted for, is to be auxiliary powered, not a few wooden steamers, intended for purely coast-wise service, have either been completed or are now on the stocks. One ship yard is building two wooden

space of six months, over 15 large new wooden vessels of various types have been launched from north Pacific yards as indicated by the following: Puget Sound, one; Grays Harbor, six; Oregon, seven, and California, one. There are now under construction, or contract, 70 wooden vessels, as follows: Puget Sound, 18; British Columbia, nine; Grays Harbor, 14; Oregon, 24; and California, five. It is estimated that these 85 ships will have required approximately 160,000,000 feet of lumber. Their net tonnage will total about 120,000 and their combined lumber carrying capacity will be close to 130,000,000 feet. In this great fleet will be used approximately 10,000 tons of metal and the investment represented by these wooden ships is not far from \$20,000,000.

The wood used in this class of construction is the Douglas fir, of which it is estimated there are 450,000,000,000 feet on the western slopes of Washington and Oregon. This re-

in wooden construction, ship knees are an important item and here again the Pacific builder is well fortified. Douglas fir trees offer some of the largest and best ship knees that can be obtained. Stumps on level ground yield knees of 90 degrees while those on hillsides offer knees at almost any angle desired.

#### How Diesel Engines Earn Their Keep

Builders and owners of diesel powered vessels are eagerly awaiting reports from the ships of this description now in commission. The five-masted schooner CITY OF PORTLAND recently completed her voyage from the Columbia river to Port Pirie, Australia, with 2,008,000 feet of lumber in 58 days, including a brief stop at Honolulu. Inasmuch as a vessel under sail would be considered making a good passage if she logged this route in less than 90 days, it is figured that auxiliary power will reduce



the time of voyages by at least 33 per cent.

When launched, the CITY OF PORTLAND was the largest vessel of her class in the world, although SANTINO, recently launched, while of the same length, 290 feet, has 4 feet more beam and 2 feet greater depth of hold than CITY OF PORTLAND, the latter's beam being 44 feet and depth 22 feet. CITY OF PORTLAND has two 4-cylinder Bolinder semi-diesel engines. Each engine is rated at 320 horsepower, swinging a 4-foot blade. Under auxiliary power alone she can make eight knots. The accompanying drawings give an idea of the outlines of this vessel whose performance on her first voyage is being followed with absorbing interest.

In an effort to help the lumbermen of the Pacific coast solve the prob-

changing their shape. Speaking of motive power, Mr. Erismann says:

"The advent of the oil engine as a cheap motive power for sailing vessels has been extensively tried out in Europe, and long service has shown that it is economical and satisfactory, and leaves no doubt as to its adaptability to the requirements of the lumber carrying trade."

Mr. Erismann points out that his design conforms to the general practice of the Pacific coast for vessels in the lumber trade with such improvements as experience dictates, such as the addition of auxiliary machinery. He adds:

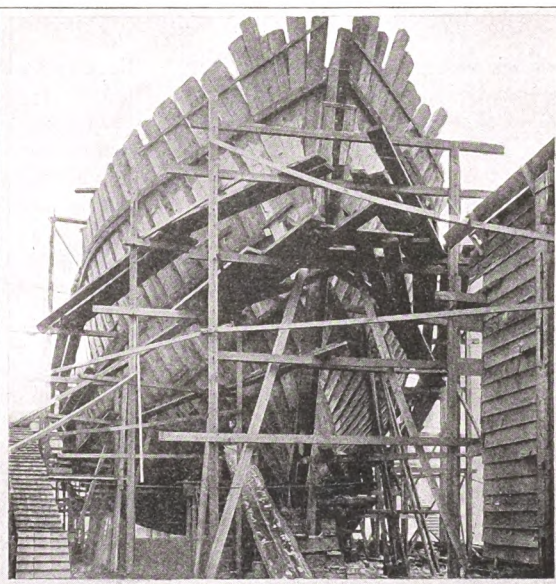
"Expense has been saved in rigging and the simplest sail spread has been provided for, which would be entirely handled from the deck. The crew, which will be berthed forward, will

complete, wood construction, \$98,000; machinery and installation, \$24,000; all auxiliary machinery, \$10,000; cost complete, \$132,000. To this add cost of design, contracts, supervision, etc., 5 per cent, or \$7,920. This figures out about \$112 per gross ton. However, it is doubtful whether such a contract could be placed on the Pacific coast today for less than \$200,000. Conservative estimates of present costs are \$140 per ton, and builders have recently been asking as high as \$167 per ton.

Prior to the war, vessels of this class could have been built on the Pacific coast at about \$70 per ton, and \$112 was a conservative figure a year ago. However, the costs of all materials used in ship building have advanced so rapidly that the cost of new tonnage is easily 40 per cent



INTERIOR VIEW OF PACIFIC COAST SCHOONER SHOWING HEAVY TIMBERS USED



BOW VIEW OF WOODEN AUXILIARY SCHOONER

lem of how to move their products to foreign markets, Martin C. Erismann, of Seattle, a marine architect, some time ago drew up plans for an auxiliary-powered, five-masted schooner, adapted for the lumber trade. The accompanying sketches show the designs of Mr. Erismann. In a report, Mr. Erismann demonstrated how it would be advantageous for the lumber mills to own or control tonnage of this class. He advised vessels of about 1,125 tons net and with a carrying capacity for 1,400,000 feet. It is worthy of note that a number of auxiliary power schooners now building on this coast have been designed along the general lines suggested by Mr. Erismann. He advises against the building of very large wooden vessels because of the structural difficulties in the way of keeping them from hogging and

consist of eight seamen. In the poop will be housed the officers and engineers. There will be a saloon and cabin for the master with a wardroom, pantry and officers' quarters grouped around the engine room casing. The speed of the vessel under sail will be, in a fresh breeze, about eight knots per hour and in lighter airs, with her engines, she will be able to maintain a very fair schedule."

The dimensions of the vessel designed by Mr. Erismann call for the following:

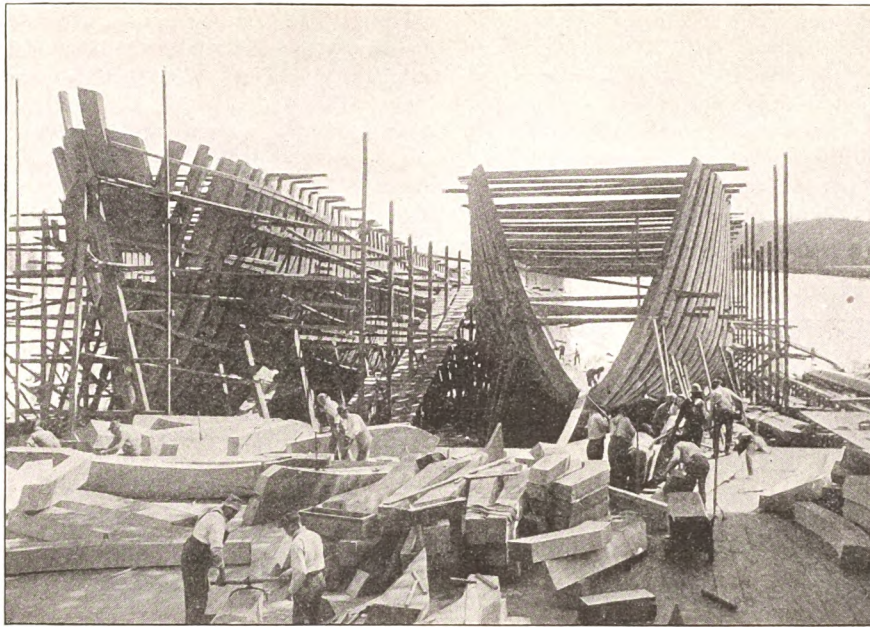
Length (custom house).....	225 ft. 0 in.
Breadth .....	42 ft. 6 in.
Depth .....	18 ft. 0 in.
Gross tonnage, about.....	1,250
Net tonnage, about.....	1,125
Speed, knots, loaded (engine)....	7
Lumber capacity, F. B. M.....	1,400,000
Machinery, 2 oil motors, 160 horsepower each	

Mr. Erismann's estimate of cost of this vessel, based on conditions several months ago was as follows: Cost

more than a year ago. In some instances it is still higher. Some large auxiliary powered schooners are under construction at coast yards at as low as \$105 per gross ton, but it is no secret that the yards may lose money on them. A contract was lately awarded for a 1,000-ton schooner at \$150 per ton, without engines. Today asking prices range from \$147 to \$167 per ton. The price at which several large auxiliary power schooners were sold several months ago to Norwegian buyers figures out \$160 per ton, which is not now considered exorbitant considering price increases since then.

All building materials have rapidly advanced in price. Ship building lumber, formerly bought at \$18 to \$20 per thousand feet, is now between \$27 and \$30. Yarn has advanced from \$2.50 per hundred-weight to \$4 and \$5;





WOODEN VESSELS UNDER CONSTRUCTION AT AN OREGON YARD

steel has more than doubled in price, and this is no small item when it is recalled that each vessel requires from 100 to 120 tons of metal. Oakum was \$2.50 and is now scarce at \$7.50 to \$8. Steel rigging was formerly about 15 per cent of total cost. Now it is from 20 to 25 per cent. All engines have risen in price and all tank work has practically doubled. It is figured that engines, installed, now cost from \$70 to \$80 per horsepower. Consequently, the builders are worried by the scarcity and high cost of all materials required by them.

#### Plenty of Power Wanted

In the earlier periods of the construction activity, the general tendency was to install two 240-horsepower engines. Now owners are inclined to have more power and two 320-horsepower engines are more popular. In the vessel designed by Mr. Erismann, tankage is provided for fuel to run the engines about 10,000 miles, and this also applies in a majority of the vessels now building.

While it is generally the case that auxiliary vessels will depend largely upon sail, in the case of the motor ship OREGON, building in Seattle for the Alaska-Pacific Navigation Co., entire dependence will be placed upon the vessel's semi-diesel engines. The two auxiliary schooners building at the Seaborn yards, Tacoma, are unique in that they will have steam. This type is regarded as an experiment and these ships will be followed with interest. The larger vessel will have a steel jigger mast which will serve the double purpose of smokestack.

While some practical mariners question Mr. Erismann's sail design, be-

lieving that a topsail schooner is the better type, Mr. Erismann has attempted to give as much sail as is compatible with easy handling. Whether there should be topsails or not is largely a matter of taste. However, as a general rule, practical men recommend a large number of small sails as against a lesser number of large sails on the grounds of economy and ease of handling.

In general the auxiliary schooners building on the Pacific coast are single-deck because of the necessity for a large and unobstructed hold for handling lumber. As a rule, they have 'tween deck beams so that, if necessary, the 'tween deck can be installed. Most of the tonnage being constructed in the northwest is being built to Lloyds or Bureau Veritas standards, indicating that some excellent vessels are being turned out. Of course, those which have been sold must be passed upon by the classification

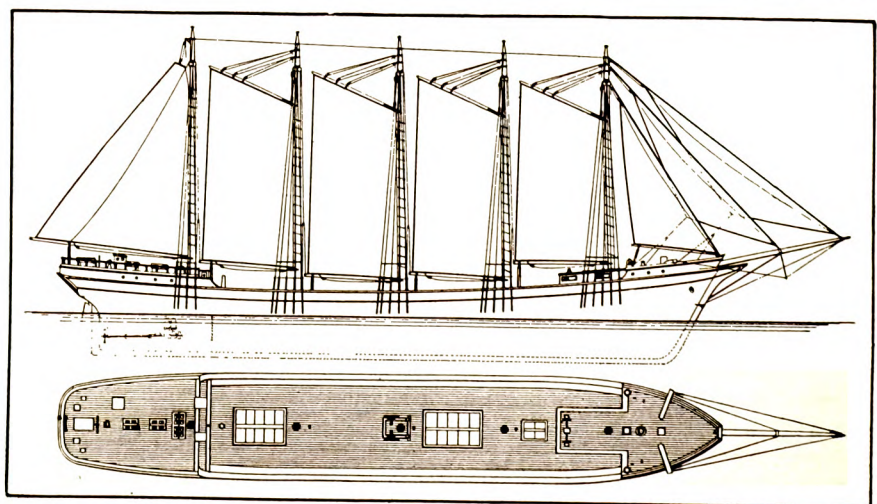
societies. While it is possible that through haste or inexperience, some of the wooden ships on the ways on the north Pacific may fail to meet requirements, the general opinion is that the new wooden tonnage is far superior to that constructed on the west coast 12 to 15 years ago. In the first place, the average size of vessels is much larger. The fact that most of the wooden tonnage is being built to Lloyds classification for a period of 12 years and then subject to extension, and that great strength is being placed in the vessels on account of their single deck construction, indicates that the new additions to the Pacific coast fleets should give long and profitable service.

#### Improvements in Construction

Many improvements in construction methods are also in vogue, all making for a better class of ship. Air or electric drills bore better and truer bolt and trunnel holes. The bolts are driven and headed by machinery, insuring not only faster but more exact construction. More care is given each vessel and, all in all, Pacific coast ship builders are profiting by experience. The new fleet of Pacific-built wooden vessels will be able to stand inspection with similar tonnage built in any other part of the world.

Careful compilation of construction work in wooden ships, recently launched, now under way or contracted for, show that Pacific coast yards have launched 15 wooden, steam, auxiliary-powered and sail vessels during the present season of activity. The same investigation indicates that yards from San Francisco bay to British Columbia have either under construction or contracts for 70 wooden ships.

As to the future of this great industry, whose present activity might be likened to a tale from the Arabian Nights, no one can make an accurate



A FIVE MASTED AUXILIARY SCHOONER FOR LUMBER TRADE DESIGNED BY MARTIN C. ERISMANN



prophecy. How long wooden ships will be in demand is a question difficult to answer, and whether wooden ship building on the Pacific coast can or will compete to any extent with steel construction, after steel returns to its normal state, is a problem equally difficult to solve.

According to those well informed in shipping, it is thought that wooden ship building on the Pacific coast will enjoy an unprecedented era of prosperity for at least three, possibly five years. This opinion is based on the pressing demand for ships, which will continue for some time after peace is declared. With ample raw material at hand, the Pacific coast will be in better position than any other section of the country to compete in wooden ship building.

When the war ceases and prices of raw material have returned to a normal level, it is not likely that the building of large wooden ships will continue with any degree of activity on this coast. There will be a demand for steam schooners and coasting vessels of steel when the latter material is again available at reasonable prices. Until that time comes, wooden ships will be built on this coast.

### Long Life Predicted

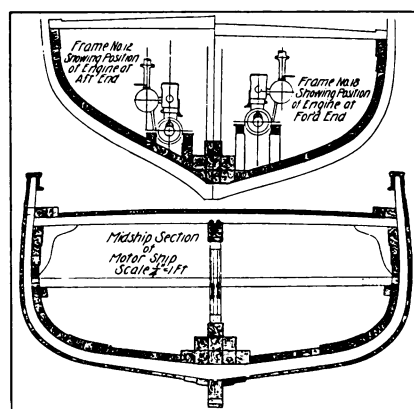
Those constructing wooden tonnage at Pacific yards, as a rule, are building with the idea that these vessels will be in first-class condition, Al, for 10 years. Long before that time expires, these ships will have paid for themselves. The owners expect them to make profitable returns for at least 10 years, when the hulls can be sold and used, in tow, for freighting ore or coal. One firm, now building, has in view 30 years of activity for its wooden motor ship, but this hull is being built with exceptional strength.

In the opinion of experts, the wooden vessel is a relic of bygone days, its most practicable use today being only for freighting lumber. However, this trade appeals to the Pacific coast where lumber is the main industry and principal export. The wooden motor ship is regarded as an ideal craft for carrying lumber from North Pacific ports to the Atlantic, and Europe, where a large market is expected to develop after conditions become normal. Under normal conditions, it is figured that lumber from the west coast can be laid down in New York for \$6.50 per 1,000 feet. If this can be done, lumber from Oregon and Washington can compete with southern pine from Gulf of Mexico ports.

The lumber exporters of the northwest are preparing for unprecedented

activity and prosperity as soon as the war ceases. Reports are current to the effect that France and Belgium will require about \$1,000,000,000 worth of lumber for temporary rehabilitation within the first two years after hostilities close. If this be true, there will be an exceptional demand for lumber carriers, and it is in this prospective trade that many of the owners now building wooden ships expect to realize their greatest profits.

On one apparently insignificant matter the prosperity of wooden ship building on the Pacific coast in reality depends. That is on the action of the United States government on the question of imposing canal tolls on deck loads. Pacific coast lumber schooners carry about 40 per cent of their capacity on deck. If this deck load is taxed, it will deal a deadly blow not only to the lumber industry, but to wooden ship building on the



CROSS SECTIONS OF MOTOR SHIP  
CITY OF PORTLAND

Pacific. The tolls on deck loads were removed some time since, but lately an agitation has been begun to impose this tax. If the government refuses to impose this additional burden, the wooden ship building industry on the Pacific is thought to be at the beginning of a long era of prosperity, certain to last three years, and possibly five or 10.

The inactivity in wooden ship building during the last 10 or 12 years has resulted in a dearth of competent shipwrights. The same difficulty in obtaining skilled labor of this class is reported by all the yards in the northwest.

### Doubled in Two Years

American shipping in the foreign trade has increased from 2,405 vessels of 1,076,152 gross tons on June 30, 1914, to 3,135 vessels of 2,194,470 gross tons on June 30, 1916. Nearly half of this tonnage, 320 vessels of 1,074,679 gross tons, hails from New York City.

### Steamer on Rocks

The passenger and package freight steel steamship *CAROLINA* of the Goodrich Transit Co., crashed on to the rocks in Lake Michigan between Algoma and Sturgeon Bay, Wis., during a heavy fog on the night of Dec. 3. A large hole was stove in her bottom and her hold rapidly filled with water. The six passengers and crew of 75 were taken safely ashore in the lifeboats.

A. W. Goodrich, president of the line, hastened immediately to the scene with a diver. It was ascertained next morning that the ship was resting on the bottom with her hold full of water, and about one-third of her upper works above the surface. The management secured the wrecker *FAVORITE* and she released *CAROLINA* on Dec. 22, and towed her to Manitowoc. Heavy weather in the next few days after the accident caused additional damage and hindered the work of raising the sunken steamer.

*CAROLINA* is about 250 feet in length and 40 feet beam. Her commander for the past several years has been Capt. D. J. McGarity, and her engineer, J. P. Breuer, both of Chicago. She has had an interesting history, having been built in 1892 as the private ocean-going yacht of Miss Helen Gould. In 1898, at the beginning of the Spanish-American war, the millionairess made a gift of the vessel to the United States government, and *CAROLINA* did good service for the sailors and soldiers as a hospital ship during the war. Soon after the close of the war she was remodeled as a Great Lakes passenger steamer and was acquired by her present owner, who has operated her for many summers as a tourist passenger carrier between Chicago and Michigan ports. In the winter, the company, which operates an all-year service on Lake Michigan, has used her as one of its fleet of "ice-bird" freighters between Chicago, Milwaukee and northern Wisconsin ports, and she has had many exciting experiences in navigating the midwinter lake ice.

The Goodrich company is the oldest existing steamship company on Lake Michigan. This concern bought *CAROLINA* for \$350,000. Recently, however, it is understood to have refused an offer of \$750,000 for her from a seaboard company.

The steamship *JONANCY*, pioneer vessel of the new Federal service between Philadelphia and Mediterranean ports, arrived in Philadelphia on her first voyage, recently.



# Lake Accidents in Last Half of 1916

Number of Mishaps Last Year Shows Increase Over 1915

—Total Losses in 1916 Were 14, and 72 Lives Were Lost

A REVIEW of the casualties which occurred on the Great Lakes during 1916 shows a large increase in the number of lives lost and of ships sunk. There were 72 lives lost, while total ship losses numbered 14. Three of these vessels were destroyed in the first half of the year and 11 in the last half. These losses were as follows:

Mar. 17.....	Str. City of Midland
May 8.....	Str. S. R. Kirby
June 26.....	Str. Panther
Aug. 21.....	Str. Saronic
Aug. 30.....	Str. St. Ignace
Sep. 17.....	Bge. Rob Roy
Sep. 25.....	Str. Roberval
Oct. 20.....	Str. Marshall F. Butters
Oct. 20.....	Str. J. B. Colgate
Oct. 20.....	Str. Merida
Oct. 20.....	Bge. D. L. Filer
Oct. 20.....	Bge. Sam Flint
Nov. 9.....	Sch. James H. Hall
Nov. 26.....	Bge. Exile

Seven of the foregoing foundered, three were destroyed by fire, two ran aground and were wrecked, one was lost through collision and one sprang a leak and sank.

The loss of life during 1916 was four times greater than in 1915, numbering 72 against 18. The tremendous loss of life through the EASTLAND disaster is, of course, not included in the 1915 figure. Twenty of the crew of the steamer S. R. KIRBY were lost when that vessel foundered in Lake Superior on May 8,

and 51 lives were lost in the storm of Oct. 20, including 21 on the steamer COLGATE, 23 on MERIDA, six on the barge FILER and one man who was washed overboard from the barge I. L. BELL. One man from the scow HANDY ANDY was drowned when she collided with the steamer SAMUEL MATHER on Oct. 31.

A record of accidents which occurred during the first half of 1916 was published in the August issue of *The Marine Review*. The accompanying summary covers those accidents occurring during the last half of the year. It will be noted that aside from the total losses, the most disastrous accidents were caused through collisions. Although 50 per cent of the total number of accidents were due to vessels stranding, running aground or hitting obstructions, the monetary loss to vessel owners from these causes was small in comparison with the heavy loss involved in collisions. The number of accidents of the former kind was 83, while collisions numbered 28. The combined loss through these 28 collisions is conservatively estimated at \$485,000. Some of the more serious collisions included the following: HUTCHINSON-SMITH, July 2, in St. Mary's river; OAKES-MULLEN, July 8, Lake Superior; MARQUETTE-

KOPP, July 25, Detroit river; NOTTINGHAM-MORDEN, July 27, Lake Superior; TOPEKA-CHRISTOPHER, Aug. 15, Detroit river; CITY OF ERIE-BELGIUM, Sept. 7, Cleveland harbor.

Serious damage was also suffered by the steamer PETER REISS, which ran ashore on St. Martin's reef, Green bay, on Sept. 6, and was forced to spend two weeks in dry dock for repairs; the steamer ANDASTE, which hit a pier at Lorain on Sept. 24, resulting in \$23,000 damage; the steamer M. A. BRADLEY, which struck at Toledo late in October and spent 12 days in dry dock; and the steamer J. P. MORGAN, which ran aground in the Straits of Mackinac on Nov. 19 and sustained heavy damage.

Another important cause of accidents which has previously been relatively unimportant is found in the large number of collisions which occurred through vessels striking bridges, piers, docks and other shore structures. Thirty-two instances of this nature are recorded. Machinery trouble, as well as difficulties encountered through deranged rudders, wheels and fire, were among the minor contributing causes. Although several vessels were caught fast in the ice during the concluding days of the season, no serious damage was sustained.

## Accidents to Lake Vessels in Second Half of 1916

Date.	Name of Vessel.	Nature of Accident.	Location.
July 1	Tug W. B. Sanders.....	Lost her rudder; towed to Cleveland for repairs.....	Lake Erie, near Bass island.
July 1	Str. Pontiac .....	Lost her rudder; towed to Cleveland, where she was docked for new shoe and rudder.....	Lake Huron.
July 2	Str. Charles W. Hutchinson.	Collided with steamer Lyman C. Smith and sank; raised July 4, and temporarily repaired at the Soo on July 5; later beached near Middle island to readjust temporary patch, which worked off; 39,000 bushels of grain damaged; arrived at Buffalo on 15th; docked at Lorain July 22; collision bulkhead doubled over, 39 plates damaged and heavy internal damage; left dry dock Aug. 10. Wrecking bills on Hutchinson and Smith estimated at \$60,000 .....	Off Cedar Reef, Upper St. Mary's river.
July 2	Str. Lyman C. Smith.....	Collided with steamer Charles W. Hutchinson; bow stove in and badly damaged. Arrived at Toledo July 11, where she remained two weeks for repairs.....	Off Cedar Reef, Upper St. Mary's river.
July 2	Str. J. H. Sheadle.....	Collided with steamer J. A. McKee; cement patch put over hole punched in her by McKee and she left the Soo on July 3; repaired at Ecorse, leaving there on July 13; seven plates repaired and new hawse pipe put in. McKee slightly damaged.....	Soo.
July 4	Pass. Str. Huron.....	Collided with steamer G. J. Grammer when she became pocketed between Grammer and another vessel, suction causing her to hit Grammer; bow damaged; repaired at Ecorse.....	Channel, near Peché island.
July 4	Str. G. J. Grammer.....	Collided with passenger steamer Huron; port bow slightly damaged .....	Channel, near Peché island.
July 6	Str. Christopher Columbus...	Collided with Buffalo street bridge, tearing away 20 feet of upper deck and rail of bridge. City of Milwaukee sued on Sept. 22 by Goodrich Transit Co., owner of Columbus, for \$1,104 damages for injury to steamer.....	Milwaukee.
July 7	Str. H. P. McIntosh.....	Ran aground, downbound with ore.....	St. Clair river.
July 8	Str. Martin Mullen.....	Upbound, light, collided in fog with steamer H. K. Oakes; hit amidships and one plate cracked; owners of Mullen brought suit against Oakes on Sept. 13 for \$26,000 damages.....	Lake Superior, 35 miles above Portage ship canal.

(Continued on page 69)

## Accidents to Lake Vessels in Second Half of 1916

(Continued from page 68)

Date.	Name of Vessel.	Nature of Accident.	Location.
July 8	Str. H. K. Oakes.....	Downbound, with ore, collided with steamer Martin Mullen in fog; starboard bow badly damaged and anchor lost; 32 plates damaged; repaired at Buffalo; work completed July 29.....	Lake Superior, above Portage ship canal.
July 9	Str. Cream City.....	Ran aground, downward with lumber; released by tug.....	Detroit river.
July 10	Str. Midland .....	Struck by steamer Sacramento; bow slightly damaged.....	Near Port Huron, St. Clair river.
July 10	Str. Sacramento .....	Steering gear became disabled and she struck steamer Midland...	Near Port Huron, St. Clair river.
July 12	Str. Mataafa .....	Ran aground; released after lightering 1,000 tons of ore; reloaded lightered ore; not damaged.....	Middle ground, St. Clair river.
July 12	Str. John Plankinton.....	Picked up in disabled condition by steamer Mecosta and towed to Soo for machinery repairs.....	Off Presque Isle, Lake Huron.
July ..	Str. Iroquois .....	Lost her rudder; left Soo July 13 in tow of two tugs for Goderich	Above Round island.
July 14	Str. Charles Horn.....	Hit steamer A. W. Osborne and then steamer William Livingstone; no serious damage done.....	St. Clair river.
July 15	Str. Fleetwood .....	Loaded with stone, collided with air line railway bridge between Port Colborne and Welland, throwing bridge out of commission for a day; navigation blocked in canal; steamer considerably damaged .....	Welland canal.
July 16	Str. Sonora .....	Ran aground in thick weather; released, uninjured.....	Above Pt. Iroquois.
July 17	Str. City of Detroit III.....	High pressure cylinder head cracked; steamer lost one trip through accident .....	Lake Erie.
July 19	Str. Joseph Sellwood.....	Struck while backing out of slip; No. 2 tank on port side filled with water; temporarily repaired and docked at Lorain, July 24; two plates taken off; two days in dry dock.....	Calcite, Mich.
July ..	Bge. M. Corry.....	Broke away from steamer M. Sicken and stranded on rock.....	Manitoulin island, Georgian bay.
July 20	Str. Arthur Orr.....	Ran ashore on a flat rock; released on 23rd after lightering; cargo not damaged. ....	Georgian bay.
July 21	Str. Frank E. Kirby.....	Ran off her course and went aground; released herself, uninjured .....	Off Ballast island, Lake Erie.
July 22	Str. R. L. Agassiz.....	Hit a bridge and punched hole in her bow; after unloading her coal cargo, was docked at Superior; repairs completed July 31..	Duluth, Minn.
July 24	Str. Lewiston .....	Struck a rock, causing leak; left Soo on July 26 for Manitowoc, where she was repaired.....	Near Algonquin dock, Soo.
July 25	Str. Marquette .....	Downbound, collided in thick weather with steamer J. T. Kopp; lost rudder and wheel and steering engine demolished; stern pushed in close to cabin and heavy internal damage done; temporarily repaired at Ecorse and went to Cleveland to unload; returned to Ecorse in tow of tugs and was docked; out of commission about one month.....	Lower Detroit river, near Grassy island.
July 25	Str. J. T. Kopp.....	Downbound, collided with steamer Marquette in thick weather; big hole made in bow above water line; docked at Ashtabula July 26, leaving ship yard Aug. 11.....	Lower Detroit river, near Grassy island.
July 24	Str. Yuma .....	Collided with steamer Richard Trimble; two plates dented and several frames bent. Trimble not damaged.....	Middle Ground, St. Clair river.
July 25	Str. Owana .....	Machinery broke down; towed to Detroit.....	St. Clair river.
July 26	Str. C. H. Little.....	Collided with steamer Huron.....	Detroit river.
July 26	Str. E. G. Crosby.....	Crashed into government pier when steering gear balked; put back to her dock for examination; two plates damaged; proceeded on her trip.....	Milwaukee.
July ..	Str. Natironco .....	Ran ashore; tug and lighter sent to her.....	Morgan Point, above Port Colborne.
July 27	Str. Nottingham .....	Upbound, light, collided with steamer Grant Morden in dense fog; stem twisted back almost her entire length; stopped at Soo; docked at Toledo July 29, remaining in dry dock about two weeks. Owners of Nottingham filed suit in September against Grant Morden for \$50,000 damage.....	20 miles above Whitefish Bay.
July 27	Str. Grant Morden.....	Downbound, with grain, collided with steamer Nottingham; struck on port bow forward of wheel house, tearing hole in her, above water line; stopped at Soo, leaving there July 31 for Buffalo, where she was docked; repairs estimated at \$20,000 and total loss to vessel approximately \$50,000.....	20 miles above Whitefish Bay.
July 28	Str. Sonoma .....	Hit a dock and twisted her rudder; repaired at Lorain.....	Cleveland.
July ..	Sand barge Harsen.....	Sank to bottom; steamer Caldwell sent to her assistance.....	Point Pelee, Lake Erie.
July ..	Str. Vulcan .....	Struck, damaging a number of plates; docked at Duluth about Aug. 6 .....	Round island.
July 31	Str. Sierra .....	Struck by steamer Empire City and tow; lost rudder; towed to Detroit where she was temporarily repaired; arrived at Lorain Aug. 2 and was docked; 18 damaged plates and a broken quadrant. Damage to both vessels estimated at \$50,000.....	St. Clair river, at Algonac.
July 31	Str. Empire City.....	Rammed by barge Carrington (in tow of steamer Sierra); lost her rudder; stern stove in; arrived at Cleveland in tow of steamer Zenith City; docked at Cleveland; repairs completed Aug. 14. Damage to both vessels estimated at \$50,000.....	St. Clair river, at Algonac.
July 31	Bge. Abyssinia .....	(In tow of steamer Maruba). Rammed Consul street bridge, damaging her spar and also rail of bridge; repaired at Cleveland....	Toledo.
Aug. 1	Str. W. L. Smith.....	Ran aground, ore-laden; released after lightering not damaged...	Near Cheboygan, Lake Michigan.
Aug. 2	Str. Mars .....	Ran aground while leaving port; released on 3rd, after lightering part of coal cargo; slightly damaged.....	Conneaut, O.
Aug. 3	Str. Capt. Thomas Wilson...	Hit a scow; repaired at Buffalo, eight plates being replaced; repairs completed Aug. 12; scow also damaged.....	Buffalo.
Aug. ..	Bge. Montezuma .....	Upon being unloaded, leak was discovered; approximately 20,000 bushels of her 179,000-bushel grain cargo damaged; temporarily repaired at Buffalo.....	Buffalo.
Aug. 3	Str. Matthew Andrews.....	Struck; upbound; released Aug. 5 after lightering part of her coal cargo .....	Bois Blanc island, Detroit river.
Aug. ..	Str. Eaton .....	Hit a dock, damaging her bow; repaired at Ogdensburg.....	Welland canal.
Aug. 4	Str. Saxona .....	Struck; docked at Lorain Aug. 5 for repairs to shoe and rudder; left dry dock Aug. 11.....	Huron, O.
Aug. 6	Str. Perseus .....	Ran aground; loaded with coal; released, uninjured.....	Detroit river.
Aug. 6	Str. R. P. Ranney.....	Ran aground; released Aug. 7 after lightering 600 tons of ore..	Cedar Point, Soo river.
Aug. 6	Str. Ishpeming .....	Upbound, light; blown ashore in rain storm; released by tugs; slightly damaged .....	Sailors' Encampment, St. Mary's river.

(Continued on page 70)



## Accidents to Lake Vessels in Second Half of 1916

(Continued from page 69)

Date.	Name of Vessel.	Nature of Accident.	Location.
Aug. 7	Bge. Ida Keith.....	Sprang a leak when she collided with B. & O. dock; lightered part of coal cargo, temporarily repaired and left Aug. 10.....	Sandusky Bay.
Aug. ..	Str. Topeka .....	Stranded; released by wrecker Favorite; not damaged.....	Drummond island, near Detroit.
Aug. 10	Str. Caldera .....	Hit the pier, denting a few plates.....	Soo.
Aug. 11	Str. E. N. Saunders.....	Hit a bridge; damaged her bow; repaired.....	Toledo.
Aug. 11	Str. George Burnham.....	Hit by barge Cutler; big hole punched in her port side; put back to Cleveland.....	Soo.
Aug. 11	Bge. D. G. Cutler.....	Collided with steamer George Burnham.....	Soo.
Aug. 12	Str. B. F. Berry.....	Downbound, with ore; while leaving pier was hit by barge Marsala, upbound, damaging five plates, twisting stern and breaking hawse pipe and anchor; proceeded to South Chicago; arrived Cleveland Aug. 23, for repairs.....	Soo.
Aug. 12	Str. Coralia .....	Collided with steamer B. F. Berry; two plates and frames abreast of boiler house damaged.....	Soo.
Aug. 12	Bge. Marsala .....	Collided with steamer B. F. Berry; four plates damaged; repaired at Cleveland; new hawse pipe installed.....	Soo.
Aug. 13	Pass. Str. Huron.....	Broke her wheel; towed to Detroit for repairs; out of commission for the season.....	Soo.
Aug. 13	Str. J. T. Hutchinson.....	Struck while leaving port; docked at South Chicago Aug. 14....	Indiana Harbor.
Aug. 14	Bge. Santiago .....	Ran aground.....	Ballard's Reef, Detroit river.
Aug. 15	Str. Topeka .....	Struck by steamer Christopher and sank in 40 feet of water in four minutes; crew rescued by Christopher; owners of Topeka sue Christopher for \$132,624; Topeka valued at \$125,000, and balance asked covers wrecking charges, personal effects lost by crew, etc. ....	Detroit river, near Mullen's dock.
Aug. 15	Str. Christopher .....	Collided with steamer Topeka; bow damaged; temporarily repaired at Ecorse, leaving there Aug. 16; docked at Lorain Aug. 18; 15 plates damaged, stem taken out and new hawse pipe installed; left Lorain Sept. 2.....	Detroit river, near Mullen's dock.
Aug. 20	Str. Richland Queen (nee Amazonas) .....	Slightly damaged by fire; 40,000 bushels of grain cargo damaged..	Depot Harbor, Ont.
Aug. 21	Pass. Str. Saronic.....	Downbound, sprang a leak shortly after leaving the Soo; beached at Cockburn island, east of Detroit; caught fire later and burned to water's edge; insured for about \$100,000; total loss; burned hull towed to Milwaukee Oct. 4.....	Soo river.
Aug. 21	Str. Maritana .....	Ran ashore in heavy fog; released by tug, uninjured.....	North Point, Lake Michigan.
Aug. 22	Str. Fairfax .....	Collided with steamers Simla and Advance; slightly damaged.....	Lachine canal.
Aug. 22	Str. Simla .....	Collided with steamers Fairfax and Advance; docked at Kingston for repairs.....	Lachine canal.
Aug. 22	Str. Advance .....	Collided with steamers Simla and Fairfax; docked at Kingston....	Lachine canal.
Aug. ..	Str. Hamiltonian .....	Ran ashore on stony bottom; released on 27th after lightering about 250 tons.....	Lake Ontario, near Iroquois.
Aug. ..	Str. Mary Battle.....	Badly damaged and was held at Sarnia in Detroit River; license revoked, but later was permitted to proceed to Port Colborne light; docked at Reid's, Port Huron, about Sept. 25.....	Lake Huron.
Aug. ..	Str. George W. Peavey.....	Hit a pier; docked at Milwaukee Aug. 25.....	Erie, Pa.
Aug. 23	Str. J. W. Follette.....	Hit a log; leaked badly.....	Ogdensburg, N. Y.
Aug. ..	Bge. Chickamauga .....	Downbound with ore, sprang a leak; stopped at Port Huron Aug. 23 to take on a pump; docked at Cleveland Aug. 29.....	Lake Huron.
Aug. ..	Tug Josephine .....	Picked up on 26th in disabled condition and towed to Harbor Beach breakwater; shaft broken.....	Lake Huron, near Harbor Beach.
Aug. 28	Str. Frank E. Kirby.....	Broke jenny arm soon after leaving Middle Bass for Detroit; stopped at Put-in-Bay for repairs, passengers being transferred to another steamer; later, while entering Detroit river, another break occurred.....	Lake Erie.
Aug. 29	Str. United States.....	Broke air pump in midlake, towed to Milwaukee in disabled condition.....	Lake Michigan.
Aug. 29	Str. W. K. Kirby.....	On entering river ran into raft of logs, scattering them; docked at Cleveland Oct. 8 for machinery repairs. Logs cleared away by tugs.....	St. Clair river.
Aug. 30	Str. Matthew Andrews.....	Downbound with ore, ran aground; released by tugs on 31st, after lightering part of cargo.....	St. Clair river, near Algonac.
Aug. ..	Str. Wyoming .....	Ran ashore.....	Lake Ontario, near Iroquois.
Aug. 30	Str. St. Ignace.....	Totally destroyed by fire at yard of Western Dry Dock & Ship Building Co.....	Port Arthur, Ont.
Sept. 2	Str. James E. Davidson.....	Ran aground, downbound with ore; released and anchored in Hay Lake.....	West Neebish Cut.
Sept. 2	Str. Zenith City.....	Broke a feed pump; returned to Cleveland for repairs.....	Lake Erie.
Sept. 3	Str. W. F. White.....	Ran aground; released after lightering 2,000 tons of stone cargo on Sept. 4; stone dumped on river bank at Algonac.....	St. Clair river, Harsen's island.
Sept. 4	Str. Victory .....	Downbound with ore, stranded; released on 5th, after lightering 400 tons of ore.....	St. Clair river.
Sept. 4	Str. R. L. Ireland.....	Downbound with ore, stranded, owing to low water; released on 5th, after lightering.....	Bar Point, Lake Erie.
Sept. 4	Bge. R. L. Fryer.....	(In tow of steamer Kalkaska). While entering lock, was swung against pier by wind, striking hard; towed to Fort Brady pier, leaking badly; temporarily repaired at Soo.....	Poe lock, Soo canal.
Sept. 4	Str. Norway .....	Ran ashore, coal laden; several plates damaged by striking rocky bottom.....	Fox Point, Lake Michigan.
Sept. 5	Str. Midland Prince.....	Ran aground; released by tug; not damaged.....	Middle Ground, Lake St. Clair.
Sept. ..	Str. Masaba .....	Ran ashore; after tank leaked; tugs released her on 7th; docked at Port Arthur.....	Victoria island, Lake Superior.
Sept. 5	Str. J. T. Kopp.....	Damaged three plates and broke an anchor.....	Buffalo.
Sept. 6	Str. Peter Reiss.....	Ran ashore, coal laden; released Sept. 8 after lightering 1,700 tons of coal; docked at Cleveland Sept. 15; 12 plates damaged; in dry dock two weeks.....	St. Martin's Reef, Green Bay.
Sept. 6	Str. Corona .....	Stranded; released by tugs on 7th.....	Queenstown dock, Lake Ontario.
Sept. 6	Str. Keybell .....	Ran ashore in thick weather; loaded with coal; released Sept. 8; docked at Kingston; forepeak and tank leaked.....	Morgan's Point, Lake Ontario.
Sept. 7	Str. Pere Marquette 3.....	Struck rocky bottom; released.....	North Point, Lake Michigan.
Sept. ..	Str. R. W. England.....	Arrived at Superior shipyard in tow of steamer S. S. Curry, from Ashland, for new cylinder head.....	Cleveland harbor.
Sept. 7	Str. Belgium .....	Collided with steamer City of Erie; stern slightly damaged.....	

(Continued on page 71)

## Accidents to Lake Vessels in Second Half of 1916

(Continued from page 70)

Date.	Name of Vessel.	Nature of Accident.	Location.
Sept. 7	Str. City of Erie.....	Collided with steamer Belgium; damage estimated at \$20,000; about 10 days for repairs. Officers of both vessels exonerated from blame by local inspectors at Cleveland upon investigation held Dec. 26; heavy weather and crowded condition of harbor held as causes of accident.....	Cleveland harbor.
Sept. ..	Str. E. J. Buffington.....	Hit a bridge abutment, damaging three plates; docked at Lorain, Sept. 7.....	Lorain.
Sept. ..	Str. Presque Isle .....	Broke her crank shaft.....	Lake Erie.
Sept. ..	Str. Mataafa .....	Hole punctured in bottom; went to Superior shipyard Sept. 8, where cement patch was placed over hole; later loaded.....	.....
Sept. ..	Str. D. G. Kerr.....	Struck a rock going into port; nine plates damaged; docked at Lorain, Sept. 10, leaving there on 14th.....	Conneaut, Lake Erie.
Sept. 9	Bge. George H. Corliss.....	Ran aground; (in tow of steamer Alexander McDougall) released by tug and lighter.....	Russell island, St. Clair river.
Sept. 11	Str. John B. Ketcham.....	While entering harbor, ran into west pier, smashing bow; unloaded at Port Colborne; docked; loaded with coal.....	Port Colborne, Ont.
Sept. ..	Str. Edward Slick.....	Struck an obstruction; damaged rudder and loosened several rivets; docked at Lorain Sept. 14, leaving there on 20th.....	Ashtabula.
Sept. ..	Str. H. Houghton.....	Rolled over while at Mullen's dock; floated by Reid Wrecking Co. Damaged stern and forefoot when she hit pier; docked at Kingston	Sandwich, Ont., Detroit river.
Sept. 15	C. F. Marquette and Bessemer No. 2.....	Collided with steamer Frank C. Ball; slightly damaged.....	Conneaut.
Sept. 15	Str. Frank C. Ball.....	Collided with car ferry Marquette & Bessemer No. 2; several plates damaged.....	Conneaut.
Sept. 17	Bge. Rob Roy.....	Sprang a leak and sank; carried 600 tons coal; wreck is menace to navigation.....	Lake Erie, 4 miles off port of Erie.
Sept. ..	Str. H. B. Hall.....	Became disabled; picked up by steamer Oakland and towed to Port Hope.....	Lake Ontario.
Sept. ..	Str. LaBelle .....	Hit a rock; twisted her rudder stock.....	Duluth.
Sept. 20	Str. Harvester .....	Ran aground, owing to low water; lightered part of her ore cargo	Ashtabula.
Sept. 20	Str. A. B. Wolvin.....	Boiler became disabled; arrived at Duluth on 19th in tow of steamer J. C. Wallace.....	Above Whitefish Point, Lake Superior.
Sept. 23	Str. W. L. Brown.....	Lost her wheel; towed to Bar Point by a tug and from there to Ashtabula by steamer J. J. Turner, arriving at Ashtabula on 25th; new wheel installed at Cleveland, Sept. 27.....	Lake St. Clair.
Sept. 24	Str. Andaste .....	Hit a pier; damage estimated at \$23,000; repaired at Ashtabula. License of first mate revoked for three months by local inspectors at Cleveland on Dec. 27 for failure to carry out captain's orders. Mate was in charge of vessel and did not notify the captain when vessel arrived off Lorain, according to the latter's instructions.....	Lorain.
Sept. 25	Str. Roberval .....	Foundered; four of crew rescued after drifting about on a raft for 20 hours; two others rescued in a yawl.....	Lake Ontario, 9 miles from Oswego.
Sept. 26	Str. C. O. Jenkins.....	Struck an obstruction.....	Lake Michigan, near Poe reef light vessel.
Sept. 27	Str. Wm. G. Mather.....	Starboard winch torn from its fastenings by strain on cable while steamer was checking away from Lackawanna Steel plant; repaired at Cleveland.....	Buffalo.
Sept. 27	Str. C. A. Black.....	Damaged her spars by hitting Central viaduct.....	Cleveland.
Sept. ..	Str. J. A. Donaldson.....	Struck; docked at Ashtabula, Sept. 29.....	Soo.
Sept. 30	Str. Pegasus .....	Hit obstruction; propeller damaged.....	Lake Huron.
Sept. ..	Str. Nipigon .....	Ran ashore; reported to be severely injured.....	Morrisburgh, St. Lawrence river.
Oct. 1	Str. F. W. Hart.....	Ran aground; released, uninjured.....	Fairport, Lake Erie.
Oct. ..	Str. Richland Star.....	Struck a pier, damaging a number of planks and frames; docked at Cleveland, Oct. 3; repairs completed at Cleveland yard, Oct. 25.....	Huron, Lake Erie.
Oct. ..	Str. Simla .....	Sank; released and taken to Kingston about Oct. 22; reported to be badly damaged.....	Two miles west of Brockville, Lake Ontario.
Oct. 3	Str. F. B. Wells.....	While leaving port, sheered into north pier, striking it with port anchor, driving it through her bow; hawse pipe broken, stern and 12 plates damaged; temporarily patched up and went to Ashtabula ship yard; repairs completed Oct. 21.....	Superior entry, Duluth-Superior harbor.
Oct. 3	Str. Octorara .....	Fire broke out in forward cargo hold; slightly damaged; two deck plates buckled; cargo of oakum damaged.....	Lake Huron.
Oct. 4	Str. J. H. Pellett.....	Hit by Main avenue bridge and pilot house knocked off.....	Cleveland.
Oct. 7	Str. Adriatic .....	Ran aground.....	Maumee river.
Oct. 9	Str. Susie Chipman.....	Broke her shaft while entering harbor.....	Chicago harbor.
Oct. ..	Str. Waccamaw .....	Collided with steamer Keywest; repaired at Toledo.....	.....
Oct. 12	Str. W. L. King.....	Ran aground; released by tugs.....	Corsica Shoal.
Oct. 12	Str. Howard M. Hanna Jr.....	Ran aground owing to low water; lightered considerable cargo, which she reloaded when released; repaired at Lorain.....	Soo river.
Oct. 12	Str. W. P. Snyder.....	Hit by steamer J. J. H. Brown; two plates dented and eight frames damaged; steamer Brown not damaged.....	St. Clair river.
Oct. 15	Str. Sweden .....	Lost an anchor; recovered by diver.....	Milwaukee river.
Oct. 16	Str. Nyanza .....	Sprang a leak; dropped barge Santiago, which she towed, at Cheboygan.....	Lake Huron.
Oct. 16	Sch. H. A. Holmes.....	Stripped of all her canvas while out in storm; broke away from steamer A. Y. Gowen, which towed her; picked up by Coast Guard steamer 10 miles off Oswego and towed to port.....	Lake Ontario.
Oct. 16	Str. H. Dahlke.....	Damaged in storm; docked at Cleveland, Oct. 18.....	Lake Erie.
Oct. 17	Sch. Lizzie Metzner.....	Ran aground; crew rescued by Coast Guard steamer.....	Lake Ontario.
Oct. 18	Str. W. Grant Morden.....	Ran aground, owing to low water; released by tugs on 19th when water raised.....	River, at Buffalo.
Oct. 19	Str. Chicago .....	While backing out from Capitol elevator, brushed concrete dock, punching hole through one plate on side of vessel; patched up before loading was resumed.....	Duluth.
Oct. 20	Str. Marshall F. Butters.....	Foundered in storm; water entered hold of vessel and pumps were unable to keep her clear; deck load of lumber loosened; crew rescued; steamer total loss. All licensed officers exonerated from blame by local inspectors at Cleveland in examination held Dec. 26. Testimony of crew indicated that every effort was made to save vessel.....	Lake Erie, 12 miles from Southeast Shoal lightship.

(Continued on page 72)



## Accidents to Lake Vessels in Second Half of 1916

(Continued from page 71)

Date.	Name of Vessel.	Nature of Accident.	Location.
Oct. 20	Str. James B. Colgate.....	Foundered in storm; loaded with coal; 21 lives lost; captain rescued after 36 hours' exposure; steamer total loss.....	Off Long Point, Lake Erie.
Oct. 20	Str. Merida .....	Foundered in storm, carrying down all on board; 23 lives lost; steamer total loss.....	Lake Erie, between Cleveland and Port Stanley.
Oct. 20	Bge. D. L. Filer.....	Foundered in gale; in tow of steamer Tempest; loaded with coal; six lives lost; vessel total loss.....	Off Bar Point, Lake Erie.
Oct. 20	Bge. Sam Flint.....	Pounded to pieces in storm; crew of eight rescued by a yacht; steamer total loss.....	Lake Huron.
Oct. 20	Bge. I. L. Bell.....	One man washed overboard during storm and drowned.....	Round island, Straits of Mackinac.
Oct. 20	Str. W. J. Olcott.....	Ran aground on soft bottom in gale.....	Middle Ground, St. Clair river.
Oct. 20	Str. E. N. Ohl.....	Ran aground in gale; released Oct. 22 after lightering 1,000 tons of cargo.....	Sandusky.
Oct. 20	Str. W. A. Paine.....	Ran aground, owing to low water; released on 21st; not damaged.	Lake Erie.
Oct. 20	Str. Sarnor .....	Sprang a leak in storm; beached when she reached port to prevent her from settling deeper into water; reached Erie with 4 feet of water in engine room.....	Black river, Lorain.
Oct. 21	Str. Francis L. Robbins.....	Ran aground, loaded with ore; released Oct. 22 by tug.....	Brighton bay, Lake Ontario.
Oct. ..	Str. Arabian .....	Ran ashore; released Oct. 23.....	Lake Ontario.
Oct. ..	Str. Thorn .....	Ran ashore; released by wrecking outfit.....	Soo river.
Oct. ..	Str. W. S. Mack.....	Struck; docked at Lorain, Oct. 25; eight plates damaged; in dry dock three days.....	Conneaut.
Oct. 25	Str. Hoover & Mason.....	Carried against breakwater when tow lines from tug parted; released Oct. 26, and taken inside; docked at Ashtabula Oct. 27; rudder, bottom and 11 plates damaged; in dry dock about six days.....	Conneaut.
Oct. 25	Tug Day .....	Lost her rudder and went to bottom in 8 feet of water under breakwater; tug was towing steamer Hoover & Mason as indicated above; floated Oct. 29 and left for Cleveland where new rudder was installed.....	Conneaut.
Oct. 25	Str. Clifford Moll.....	Hit by steamer F. C. Jones; three plates damaged; temporarily repaired.....	Ashtabula harbor.
Oct. ..	Bge. Halstead .....	Lost deck load of lumber in storm; put into Alpena Oct. 25, for shelter.....	Cuyahoga river, Cleveland.
Oct. 26	Str. John Ericsson.....	Collided with steamer A. E. Cornelius; hole punched in starboard side of Ericsson; patch put over break and vessel sailed on 27th. Cornelius not damaged.....	Maumee bay.
Oct. 27	Str. Argo .....	Ran aground, owing to low water; released Oct. 28 when water rose; not damaged.....	Belle Isle, Detroit river.
Oct. 28	Str. H. E. Runnels.....	Ran aground; released after lightering part of cargo.....	Lorain.
Oct. ..	Str. Argus .....	Arrived at Soo with broken shaft; picked up by steamer McCullough and towed to Cleveland.....	Detroit river, off Sandwich, Ont.
Oct. ..	Str. M. A. Bradley.....	Struck; docked at Toledo, Nov. 1, for bottom repairs; 26 plates and 72 frames damaged; 12 days in dry dock.....	Ballard's Reef, Detroit river.
Oct. 31	Derrick scow Handy Andy..	Hit by steamer Samuel Mather; one man drowned; scow considerably damaged and anchor broken; Mather not damaged....	Lorain.
Oct. 31	Str. Glenlyon .....	Wheel chain parted; stranded; lightered her grain cargo, which was taken by steamer Parks Foster; two tanks punctured and number of plates damaged; docked at Lorain, Nov. 11.....	Conneaut.
Oct. ..	Str. H. A. Berwind.....	Struck bottom; docked at Lorain, Nov. 1; three plates repaired..	Lake Michigan.
Nov. 1	Str. Charles S. Hebard.....	Hit by car ferry Marquette & Bessemer No. 2; slightly damaged..	Off Cove island.
Nov. ..	Str. Roumania .....	Hit an obstruction; arrived at Chicago with broken wheel; docked at Milwaukee for new wheel.....	Welland canal.
Nov. ..	Str. Alberta .....	Lost port anchor with 35 fathoms of chain.....	Lake Superior, off Passage island.
Nov. 5	Str. J. H. Shrigley.....	Carried away gates of lock No. 7 near St. Catharines; break repaired Nov. 6; steamer not damaged.....	Lake Superior, off Passage island.
Nov. 5	Str. Midland Prince.....	Stern broken at 24-foot mark when she collided with steamer Imperial; forepeak leaked; repaired at Port Arthur.....	Lake St. Clair.
Nov. 5	Str. Imperial .....	Disabled through collision with steamer Midland Prince; towed back to Port Arthur by Midland Prince; repaired at Port Arthur	Lake St. Clair.
Nov. 6	Str. Anna C. Minch.....	Downbound, collided with steamer Charles M. Warner; stopped at Detroit to lighter her grain cargo; two plates cracked, number of frames damaged and deck buckled; water entered cargo hold; cement patch put on at Ecorse shipyard, after which she re-loaded lightered grain and proceeded to Buffalo; lost one trip through accident.....	Detroit river.
Nov. 6	Str. Charles M. Warner.....	Collided with steamer Anna C. Minch; loaded with coal; stern twisted; stopped at Marine City for examination, but proceeded, docked at Toledo; repairs completed Dec. 2.....	Detroit river.
Nov. 7	Str. W. C. Richardson.....	Collided with steamer Western States; bow slightly bent; docked at Lorain Nov. 8, leaving there on 13th; 14 plates taken off and 10 renewed; all frames forward damaged; new stem put on....	Lake Michigan.
Nov. 7	Str. Western States.....	Hit by steamer W. C. Richardson on starboard bow; large hole stove in above water line, breaking fender, hull, main and promenade decks as far in as outer walls of staterooms; unloaded her freight onto steamer City of Detroit II, as her injuries were too serious for her to leave port.....	Thunder bay.
Nov. ..	Str. H. H. Hettler.....	Upbound, broke her shaft; towed to Cheboygan by wrecker Favorite.....	Fairport.
Nov. 9	Sch. James H. Hall.....	Became waterlogged in Saginaw Bay; as vessel could not be steered, she was headed back up Lake Huron; struck Thunder Bay shore and went to pieces; total loss.....	Fairport.
Nov. 10	Str. S. S. Curry.....	Hit by steamer Frank Rockefeller when she tried to avoid colliding with a scow; slightly damaged; repaired at Ecorse.....	Welland canal.
Nov. 10	Str. Frank Rockefeller.....	Collided with steamer S. S. Curry; docked at Lorain, remaining there about one week.....	Mission Point, Straits of Mackinac.
Nov. ..	Str. Steelton .....	Struck; docked at Ashtabula.....	Straits of Mackinac.
Nov. 19	Str. J. P. Morgan.....	Ran aground; released on 21st after lightering part of her ore cargo; No. 1 tank punctured and leaked in forepeak; bottom badly damaged; docked at Toledo Dec. 1, remaining in dock about two weeks; 40 plates replaced.....	
Nov. 21	Str. Christopher .....	Ran aground; released Nov. 23 after lightering 400 tons of ore; docked at South Chicago Nov. 28; seven plates damaged.....	

(Concluded on page 73)

## Accidents to Lake Vessels in Second Half of 1916

(Concluded from page 72)

Date.	Name of Vessel.	Nature of Accident.	Location.
Nov. 21	Str. Manchester .....	Disabled through broken wheel and hultowed to Milwaukee for repairs	Straits of Mackinac.
Nov. 24	S. O. Barge No. 82.....	Ran ashore on flat rock in storm; released Nov. 30; enroute from Cleveland ship yard to Montreal; heavily damaged in rough sea	Grenadier island, Lake Ontario.
Nov. 24	Str. Pontiac .....	Broke her wheel when she stuck fast in ice about 40 feet from ore dock; new wheel put on; left for Fort William Nov. 26; picked up by steamer Michigan at Harbor Beach and towed to Cleveland	Ashland, Wis.
Nov. 25	Str. W. B. Dickson.....	Struck an obstruction, tearing hole in No. 1 starboard tank; settled in 25 feet of water; floated with an air compressor on Nov. 26; docked at Lorain Nov. 27, leaving dry dock Nov. 30; two plates damaged	Black river, Lorain. Sandusky.
Nov. 26	Str. S. S. Curry.....	Ran upon channel bank; released Nov. 27; not damaged.	Off Harrisville, Lake Huron.
Nov. 26	Bge. Exile .....	Ran aground; became water logged and sank; deck load of lumber floated about Dec. 15; vessel total loss.	Near Cape Salmon, St. Lawrence river.
Nov. 26	Str. Iroquois .....	Stranded; released and docked at Collingwood ship yard.	Harbor entrance, Cleveland.
Nov. 26	Str. C. G. Breitung.....	Collided with barge Norman Kelley; five plates, hawse pipe and three frames damaged; spent a week at shipyard making repairs	Harbor entrance, Cleveland.
Nov. 26	Bge. Norman Kelley.....	Collided with steamer C. G. Breitung; repaired at Cleveland shipyard	Near Sister island, Lake Erie.
Nov. 27	Tug Exalda .....	Engine broke down in storm and tug sank in 35 feet of water.	Lorain.
Nov. 27	Str. F. E. House.....	Grounded in channel; released.	Huron.
Nov. 27	Str. Sweden .....	Ran aground owing to low water; released without lightering.	Milwaukee.
Nov. 27	Str. Saranac .....	Struck and damaged a dock.	Lake Superior.
Nov. ..	Str. Omega .....	Lost her shoe and rudder was twisted; stopped at Detour and was towed from there to Cleveland; docked at Cleveland, Dec. 8.	Buffalo.
Dec. 1	Str. John Stanton.....	While being towed to dock, struck her bilge on Ohio street bridge, damaging several plates on her port side; docked Dec. 4 at Cleveland	Lake Erie.
Dec. ..	Str. Charles S. Neff.....	Lost her wheel; docked at Buffalo for repairs.	Near entrance of Sturgeon Bay canal.
Dec. 3	Str. Carolina .....	Ran past entrance to channel and struck a sharp rock; bottom badly damaged and tank tops torn off; released Dec. 22 by wrecker Favorite and towed to Manitowoc ship yard.	Erie.
Dec. 6	Str. Nyanza .....	Ran aground while putting into port for shelter; released by tug, uninjured	Bar Point, Lake Erie.
Dec. 14	Str. W. F. White.....	Ran aground owing to low water; released on 17th after lightering about 1,000 tons of her stone cargo; docked at Lorain Dec. 22 for repairs.	Conneaut.
Dec. 14	Bge. Athens .....	Sprang a leak at coal dock; despite immediate efforts to keep her up with pumps, barge settled on bottom.	Lake St. Clair.
Dec. 15	Bge. Santiago .....	Cut through by ice; water entered her hold, causing her to sink; pumped out and towed to Detroit by two tugs.	Near Bar Point, Lake Erie.
Dec. ..	Sch. D. K. Clint.....	Struck an obstruction and sank; raised Dec. 15, towed to shallow water and repaired.	Lake Erie.
Dec. ..	Str. E. N. Breitung.....	Damaged by navigating through ice; stopped at Cleveland to repair leak and proceeded to Erie; docked at Ashtabula.	Buffalo.
Dec. ..	Sta. J. J. H. Brown.....	Damaged while entering harbor; docked at Buffalo Dec. 19.	Lake St. Clair, near Grosse Point.
Dec. 23	Str. Conneaut .....	Ran ashore on west bank of Lake St. Clair channel; released after lightering about 1,000 tons of her stone cargo on the steamer McKerchey and proceeded.	

### December Lake Levels

The United States lake survey reports the stages of the Great Lakes for the month of December, 1916, as follows:

Lakes	Feet above mean sea level
Superior .....	603.16
Michigan-Huron .....	580.56
Erie .....	571.56
Ontario .....	245.37

Lake Superior is 0.34 foot lower than last month, 0.47 foot higher than a year ago, 0.94 foot above the average stage of December of the last 10 years, 0.03 foot above the high stage of December, 1900, and 1.96 feet above the low stage of December, 1879. During the last 10 years the December level has averaged 0.2 foot lower than the November level and 0.3 foot higher than the January level.

Lakes Michigan-Huron are 0.08 foot lower than last month, 1.16 feet higher than a year ago, 0.55 foot above the average stage of December of the last 10 years, 1.96 feet below the high stage of December, 1883, and 1.56 feet above the low stage of December, 1895. During the last 10 years the December level has averaged 0.1 foot lower than the

November level and 0.2 foot higher than the January level.

Lake Erie is 0.14 foot lower than last month, 0.19 foot higher than a year ago, 0.11 foot below the average stage of December of the last 10 years, 1.97 feet below the high stage of December, 1885, and 0.70 feet above the low stage of December, 1895. During the last 10 years the December level has averaged 0.1 foot lower than the November level and 0.1 foot lower than the January level.

Lake Ontario is 0.28 foot lower than last month, 0.59 foot higher than a year ago, 0.02 foot below the average stage of December of the last 10 years, 2.24 feet below the high stage of December, 1861, and 1.94 feet above the low stage of December, 1895. During the last 10 years the December level has averaged 0.1 foot lower than the November level and 0.1 foot lower than the January level.

The steamer ERICSSON, of the Baltimore & Philadelphia Steamship Co., sprang a leak while en route to Baltimore recently and was beached in the Delaware and Chesapeake canal.

### Electricians Convene

An informal meeting of marine electricians was held at Lorain, O., Dec. 14 to 16. Among the interesting subjects discussed were "The Standardization of Marine Electrical Fixtures" and "The Use of Central Station Power for Ship Yards, and the Disadvantages of the Present Methods of Charging for Current". Visits were made to the plants of the American Ship Building Co., Lorain, O.; the Electric Controller & Mfg. Co., Cleveland; the Hickok Electrical Instrument Co., and the Pittsburgh Steamship Co.'s new bulk freighter D. M. CLEMON. It was decided to effect a permanent organization, to be known as "The Association of Marine Electricians", and the following committee was appointed: E. L. Howarth, chief electrician, American Ship Building Co., Cleveland, chairman; A. R. Martin, chief electrician, Buffalo Dry Dock Co., Buffalo; A. B. Walton, chief electrician, American Ship Building Co., Lorain, secretary; Frank Yager, chief electrician, Chicago Ship Building Co., Chicago.



# Traffic on Great Lakes in 1916

Details of the Record Breaking Tonnages Carried Last Year Are Presented—1917 Promises Equal Activity

LAKE interests are facing the navigation season of 1917 with the assurance that they must duplicate their record breaking performances of last year. *The Marine Review* pointed out just a year ago that 1916 would test the capacity of the lake fleet to the fullest extent. The fleet was operated at maximum capacity all season, with the result that all previous freight-moving records were greatly outdistanced. The forthcoming season is practically certain to match 1916 in activity, and immense tonnages of iron ore, coal and grain must be moved by the bulk freighters during the short navigation season. The accompanying tables furnish a complete record of the fleet's activities during 1916 and earlier years. The insert, presented with this issue, shows graphically how the bulk freighters moved 102,200,000 tons of freight last year, contrasted with 79,400,000 tons in 1915 and 89,300,000 tons in 1913, the best previous year. The complete report of the commerce passing through the Soo canals in 1916, shows that 25,407 vessels of 69,824,463 net tons registered passed through these waterways in 1916. The total tonnage of freight loaded through

the American and Canadian canals was 91,888,219 short tons, against 71,290,304 short tons in 1915.

The total coal movement was 28,792,800 net tons, of which soft coal represents 24,369,000 net tons and hard coal 4,423,800 net tons. The 1916 movement shows an increase of 2,500,000 net tons over 1915, but was 4,570,000 net tons less than the record set in 1913. The total grain movement in 1916 was 363,999,156 bushels, or 10,555,975 net tons, against 386,019,375 bushels or 11,194,562

net tons in 1915. The record grain movement was set in 1913 at 11,697,160 net tons. The table showing the iron ore traffic reveals shipments of 64,734,198 gross tons from upper lake ports in 1916, far surpassing any previous year's movement. Of this tonnage, Lake Erie ports received 51,807,272 gross tons and Lake Michigan ports 11,573,857 gross tons. Lake Erie docks on Dec. 1 held 10,167,760 gross tons. Shipments of iron ore to furnaces from May 1 to

Dec. 1 were 44,982,917 gross tons. The table showing the average time spent in port by vessels of the Pittsburgh Steamship Co., reveals that the average stay increased from 25 hours, 27 minutes in 1915 to 30 hours, 12 minutes in 1916. At lower lake ports the time increased from 17 hours, 41 minutes to 21 hours, 30 minutes. At upper lake ports the time increased from 7 hours, 46 minutes to 9 hours, 42 minutes. The table also presents the record for the year 1906 and clearly indicates the great improvement in dispatch made during the past decade. The steamer W. P. SNYDER JR. broke all records for a single ore cargo when she carried

## Great Lakes Traffic Statistics

### COMMERCE THROUGH SOO CANAL

		Total Traffic for		Increase or Decrease	
		Season	Season	Amount	Per Cent
		1915	1916		Inc. Dec.
Vessels:					
Steamers	Number	17,699	21,606	3,907	22 ...
Sailing	Number	1,884	2,461	577	31 ...
Unregistered	Number	1,650	1,340	310	... 19
Total	Number	21,233	25,407	4,174	20 ...
Lockages	Number	13,808	16,190	2,382	17 ...
Tonnage:					
Registered	Net	56,399,147	69,824,463	13,425,316	24 ...
Freight	Short	71,290,304	91,888,219	20,597,915	29 ...
Passengers	Number	50,336	54,922	4,586	9 ...
Coal:					
Hard	Short tons	2,030,730	2,210,219	179,489	9 ...
Soft	Short tons	11,326,328	13,912,900	2,586,572	23 ...
Flour	Barrels	8,436,937	10,239,841	1,802,904	21 ...
Wheat	Bushels	255,481,558	226,063,315	29,418,243	... 12
Grain	Bushels	64,786,870	93,189,561	28,402,691	44 ...
Mfg. and Pig Iron	Short tons	211,781	202,194	9,587	... 5
Salt	Barrels	699,337	729,840	30,503	4 ...
Copper	Short tons	156,436	126,043	30,393	... 19
Iron Ore	Short tons	45,213,604	63,452,107	18,238,503	40 ...
Lumber	M. ft. B. M.	456,451	341,352	115,099	... 25
General Mdse.	Short tons	1,595,398	1,649,020	53,622	3 ...

### COAL MOVEMENT ON LAKES, NET TONS

Year	Pittsburgh	Ohio	Virginia	Total*	Hard Coal	Total Coal Movement
1916	8,674,000	5,163,000	9,491,000	24,369,000	4,423,800	28,792,800
1915	10,100,000	2,620,000	8,750,000	22,420,000	3,800,000	26,220,000
1914	11,195,000	1,363,000	9,106,000	22,995,000	4,285,228	27,280,228
1913	13,415,473	6,176,624	8,736,586	28,328,683	5,033,696	33,362,379
1912	11,300,000	4,676,000	7,360,000	23,335,000	4,204,741	27,539,741
1911	10,611,941	4,019,544	7,151,200	21,782,685	3,917,419	25,700,104
1910	11,911,900	4,297,300	6,629,500	22,838,700	3,639,368	26,478,068
1909	8,687,395	3,002,815	3,874,570	15,564,690	3,052,706	18,617,396
1908	8,700,000	3,600,000	3,450,000	15,750,000	3,538,098	19,288,098
1907	10,549,995	4,074,296	3,420,941	18,037,232	3,449,695	21,486,927
1906	9,237,272	2,560,906	2,743,732	14,591,910	2,681,808	17,273,718
1905	7,443,883	2,062,692	2,109,262	11,615,837	2,785,362	14,401,199

\*Includes fuel coal and also shipments from the Kentucky district and Pennsylvania districts other than Pittsburgh.

### GRAIN TRADE OF THE GREAT LAKES

(Shipments of flour not included.)

	1916.	1915.	1914.	1913.	1912.
Lake Superior	319,252,876	320,236,805	218,622,167	317,051,875	243,110,902
Chicago	25,058,000	44,438,000	89,791,000	55,180,000	47,608,600
Milwaukee	3,188,280	4,324,428	10,857,683	11,867,798	16,655,248
Other ports	16,500,000	17,020,142	18,430,099	19,250,672	15,806,389
Totals, bushels	363,999,156	386,019,375	337,718,949	403,360,346	323,181,139
Totals in net tons	10,555,975	11,194,562	9,793,850	11,697,160	9,372,252

### CONTRACT FREIGHT RATES ON IRON ORE AND COAL

	Cents, 1916	Cents, 1915	Cents, 1914	Cents, 1913	Cents, 1912	Cents, 1911	Cents, 1910
Iron ore, head of Lake Superior to Ohio ports, gross ton	50	40	50	55	50	60	70
Iron ore, Marquette to Ohio ports, gross ton	45	35	45	50	45	55	65
Iron ore, Escanaba to Ohio ports, gross ton	35	25	35	40	35	45	55
Coal, Ohio ports to Lake Michigan ports, net ton	30	30	30	30	30	30	35
Coal, Ohio ports to Duluth, net ton	30	30	30	30	30	30	35

### AVERAGE DAILY FREIGHT RATES ON GRAIN AND LUMBER

	4.18	2.25	1.14	2.01	2.02	1.17	1.33
Wheat, Duluth to Buffalo, bushel	4.18	2.25	1.14	2.01	2.02	1.17	1.33
Wheat, Chicago to Buffalo, bushel	3.08	1.20	1.13	1.43	1.39	1.08	1.44
Lumber, head of lakes to Lake Erie ports	364	261	225	256	276	260	234

13,694 tons from Duluth to Ashtabula in July. D. G. KERR carried 13,521 tons from Duluth to Huron. The previous record was 13,333 tons carried by H. H. ROGERS from Escanada to South Chicago. The steamer COL. J. M. SCHOONMAKER set a new coal carrying record, taking a cargo of 14,474 tons from Ashtabula to Duluth. This tonnage is exclusive of the fuel carried. WILLIAM P. SNYDER had held the record with 13,847 net tons. The steamer W. GRANT MORDEN, which broke both the wheat and oats carrying-records in 1915, bettered her previous performance by carrying 491,000 bushels of wheat out of Fort William on July 16, bound for Port McNicoll. In 1915 her best record was made when she carried 476,315 bushels of wheat on one trip.

The best records set at the Duluth, Missabe & Northern railroad dock at Duluth in 1916 were as follows: The

### Furnace Shipments

ORE FORWARDED TO FURNACES  
FROM LAKE ERIE DOCKS,  
MAY 1-DEC. 1.

Year	Gross Tons	Year	Gross Tons
1916.....	44,982,917	1913.....	35,747,800
1915.....	35,149,412	1912.....	33,421,251
1914.....	22,914,887	1911.....	23,011,274

company's coal dock unloaded 12,558 tons of coal from the steamer D. G. KERR in 17 hours, or at the rate of 246.2 tons per hour; the steamer P. A. B. WIDENER was loaded with 11,379 tons of iron ore (bill of lading weight) in 1 hour, 30 minutes, or at the rate of 7,586 tons per hour.

### Lake Erie Ore Receipts

Receipts of ore at Lake Erie ports during December were 1,429,630 gross tons. The following table shows amounts received at the different ports:

Buffalo .....	202,676
Erie .....	117,634
Conneaut .....	361,076
Ashtabula .....	268,240
Fairport .....	42,079
Cleveland .....	206,662
Lorain .....	127,048
Huron .....	23,003
Toledo .....	52,321
Detroit .....	28,891
Total .....	1,429,630

The entire cargo of the Swedish steamer THORNE, consisting of 5,873 tons of iron ore, was discharged at the piers of the Philadelphia & Reading railway, Philadelphia, recently, in the record time of 13 working hours. In that time the cargo was not only discharged but was also placed in cars and weighed.

The schooner EMMA HARVEY, which was found floating bottom up off Santa Rosa Island, 12 miles from Pensacola, has been towed to Biloxi and is being repaired.

## Iron Ore Traffic on Great Lakes in 1916

### IRON ORE SHIPMENTS FROM UPPER LAKE PORTS, GROSS TONS

	1916.	1915.	1914.	1913.	1912.	1911.
Escanaba .....	7,457,444	5,649,289	3,664,451	5,399,444	5,234,655	4,278,445
Marquette .....	3,858,092	3,099,589	1,755,726	3,137,617	3,296,761	2,200,380
Ashland .....	8,057,814	5,146,772	3,363,419	4,338,230	4,797,101	2,429,290
Superior .....	12,787,046	8,342,793	11,309,748	13,788,343	14,240,714	9,920,490
Duluth .....	21,837,949	15,437,419	6,318,291	12,331,126	10,495,577	6,934,269
Two Harbors ...	10,735,853	8,642,942	5,610,262	10,075,718	9,370,969	6,367,537
Total .....	64,734,198	46,318,804	32,021,897	49,070,478	47,435,777	32,130,411

### IRON ORE RECEIPTS AT LAKE ERIE PORTS, GROSS TONS

	1916.	1915.	1914.	1913.	1912.	1911.
Detroit .....	425,579	459,877	332,564	363,001	418,057	243,292
Toledo .....	2,035,160	1,158,374	773,711	1,084,215	1,411,278	493,345
Huron .....	1,324,112	695,865	617,363	687,485	540,586	223,947
Lorain .....	4,613,929	3,517,258	1,677,988	3,709,213	3,771,350	2,937,605
Cleveland .....	10,669,745	7,504,697	5,519,698	8,812,583	7,914,836	4,584,211
Fairport .....	2,580,647	2,001,103	1,558,134	2,037,126	1,801,381	666,365
Ashtabula .....	11,474,268	7,813,101	5,318,788	8,336,126	8,158,080	6,359,131
Conneaut .....	9,588,341	8,573,509	6,263,480	7,849,303	7,839,831	6,931,278
Erie .....	1,525,031	707,875	260,991	713,904	547,067	289,400
Buffalo .....	7,432,220	5,339,724	2,913,273	5,506,691	5,060,642	2,802,976
Port Colborne....	138,240	196,077	166,665	.....	.....	.....
Total .....	51,807,272	37,967,460	25,402,655	39,099,647	37,472,108	25,531,550

### IRON ORE RECEIPTS AT LAKE MICHIGAN PORTS, GROSS TONS

	1916.	1915.	1914.	1913.	1912.	1911.
South Chicago, Ill.	7,740,877	4,195,976	3,060,587	5,572,866	5,480,105	3,685,100
East Jordan, Mich.	38,573	37,658	38,158	28,444	42,878	36,232
Boyne City, Mich.	43,788	40,401	50,098	45,028	45,000	33,000
Elk Rapids, Mich.	.....	.....	28,437	.....	47,947	26,814
Milwaukee .....	239,219	187,286	93,121	234,591	138,065	109,255
Indiana Har., Ind.	793,215	689,226	661,054	455,252	514,748	365,312
Gary, Ind. ....	2,718,185	2,421,924	1,631,564	2,365,551	2,088,327	1,302,745
Total .....	11,573,857	7,572,471	6,109,019	8,701,732	8,357,070	5,558,458

### IRON ORE ON LAKE ERIE DOCKS DEC. 1, GROSS TONS

	1916.	1915.	1914.	1913.	1912.	1911.
Toledo .....	394,869	311,799	580,600	349,047	552,016	661,382
Sandusky .....	.....	1,871	2,471	2,472	2,472	2,471
Huron .....	590,743	558,692	433,769	441,541	385,810	344,371
Lorain .....	1,076,105	824,988	548,097	694,704	904,343	652,526
Cleveland .....	1,936,906	1,795,962	1,757,543	1,930,720	1,888,560	1,589,491
Fairport .....	474,930	413,994	406,124	478,014	565,920	636,566
Ashtabula .....	3,266,572	2,870,204	2,749,315	3,202,807	3,350,553	3,295,862
Conneaut .....	1,363,550	1,216,686	1,160,639	1,248,032	1,429,533	1,237,573
Erie .....	625,193	589,355	484,467	594,613	661,330	636,274
Buffalo .....	438,712	326,800	234,880	319,726	340,261	413,353
Total .....	10,167,760	8,910,351	8,407,905	9,261,676	10,080,798	9,469,869

## Average Stay in Port

### VESSELS OF PITTSBURGH STEAMSHIP CO.

	1916	1915	1914	1913	1912	1906
	hrs. min.	hrs. min.	hrs. min.	hrs. min.	hrs. min.	hrs. min.
Aver. stay lower lake ports	20 30	17 41	17 18	21 9	20 9	36 15
Aver. stay upper lake ports	9 42	7 46	9 12	13 52	11 51	22 25
Aver. time in port receiving and discharging cargoes	30 12	25 27	26 30	35 11	32 0	58 38
	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Aver. cargo carried.....	7,989	7,534	7,572	7,283	6,796	5,954
Largest cargo carried.....	13,521	12,087	12,222	12,373	13,007	13,333
Fastest loading record.....	11,379	8,179	10,613	5,897	10,325	9,277
	in 2 hr. 15 min.	in 1 hr.	in 1 hr. 30 min.	in 75 min.	in 2 hr.	in 70 min.
Rate of fastest loading record per hour.....	5,057	8,179	7,075	4,718	4,136	7,288

## Average Ore Cargo

Year	Gross Tons	Year	Gross Tons
1916.....	7,080	1906.....	6,973
1915.....	6,841	1905.....	6,101
1914.....	6,523	1904.....	5,272
1913.....	6,411	1903.....	5,668
1912.....	6,244	1902.....	4,899
1911.....	5,716	1901.....	4,459
1910.....	5,593	1900.....	3,783
1909.....	7,777	1899.....	3,803
1908.....	8,325	1898.....	3,517
1907.....	7,516	1897.....	3,556

D. M. & N. docks only up to 1910.  
All docks 1910-1916.

## Buffalo Grain Receipts

	1916	1915
Flour, bbls. ....	6,957,432	8,429,126
Wheat, bu. ....	138,668,781	166,670,198
Corn, bu. ....	3,527,207	17,281,413
Oats, bu. ....	22,036,301	10,969,616
Barley, bu. ....	11,709,053	13,512,782
Rye, bu. ....	1,477,346	3,787,863
Total, bu. ....	177,418,688	212,221,872
Fl. to wheat, bu. ...	34,787,160	42,145,630
Flaxseed, bu. ...	9,564,147	4,036,581
Grand total, bu. ....	221,769,995	258,404,083



# What the Government is Doing

Rulings on Marine Matters

Improvements to Waterways

Hints to Navigators

## Redfield Talks on Merchant Marine

**S**ECRETARY of Commerce William C. Redfield believes that hope for the development of the American merchant marine depends mainly upon three factors. They are: Enlargement of existing private ship yards; establishments of new yards, and development of construction in the navy yards. Secretary Redfield, in an interview with a representative of *The Marine Review*, specifically pointed out that all three of the elements upon which depend the building up of the merchant marine have been recognized.

Enlargement of existing private ship yards has been undertaken or plans in this direction are under way, he said, as is denoted by several of the more prominent instances. It was stated that the recent sale of the New York Ship Building Co. will mean an extension of its facilities; that the William Cramp & Sons Ship & Engine Building Co. has bought property with a view to enlarging its plant, and that the Bethlehem Steel Corporation is planning extensive expansion at the plant of the Maryland Steel Co. "It is reasonably certain," asserted Secretary Redfield, "that this process of enlargement will continue."

### More New Yards in Prospect

Referring to the matter of establishing new yards, Secretary Redfield said that many had been brought into being within the past year or two. He cited two new plants as an index of a situation that he said is general, alluding to those established at Chester, Pa., and New York harbor, and adding that reports have it that another is to be established at New London, Conn. In the opinion of Secretary Redfield, it is entirely fair to assume that certain other yards will be started, probably in the form of undertaking ship building at plants which heretofore have been devoted exclusively to the repairing of vessels.

The shipping board, Secretary Redfield explained, can build vessels either in private or government yards. There are a number of navy yards, he said, which are capable of expansion to a

considerable degree, and such an expansion, it was pointed out, would relieve appreciably the present congested condition of both private and public yards. He mentioned in particular the navy yard at Charleston, S. C., as being one which can be enlarged greatly.

A marked feature of the present situation, Secretary Redfield said, lies in the increase of wooden ship building.

"Indeed, this becomes so marked," Mr. Redfield continued, "that we felt obliged to take up anew statistics of wooden shipping. The department itself has just had a wooden steamer of unusually fine quality built at East Booth Bay Harbor, Me. She is named HALCYON, and belongs to the bureau of fisheries service."

This vessel, which Secretary Redfield, giving its ornithological significance, said was a "bird", so pleased a ship owner who examined it that the latter left an order with the East Booth Bay Harbor yard for a wooden vessel much larger than the one built for the bureau of fisheries.

"We are asking for several ships for the coast and geodetic survey service," Secretary Redfield said, "and it may be possible we shall have to consider wooden vessels when it comes to building one of them."

"It seems reasonably certain that there will be plenty of work for all ship builders. Wooden ship building had renewed life because steel ships are not to be had at a usual price or in a brief time."

"Back of the whole matter lies the necessity for prompt and adequate supply of steel material. The building of steel ships depends upon a regular flow of steel at prices that can be afforded. It is reasonable to expect to see a remarkable output of this character. There exists a golden opportunity for the United States. All of the resources we have should be exerted to the utmost to take advantage of it."

The development of ship building in the navy yards, Secretary Redfield said, should not give private yards

any concern. Public yards, he maintained, never will be used to injure private yards. Private ship builders, according to Mr. Redfield, are not as likely to be dependent upon ship building for the government in the future as they have been in the past. The development of plants at the navy yards was held to be merely one step in providing the necessary equipment for national defense and for contributing to the commerce of the country when special circumstances seem to make it necessary.

The department some time ago published a book on standardization of ship building and it is its understanding that marked progress has been made along this line in American yards.

### Steel Manufacturers Will Co-Operate

"This, of course, will involve the co-operation of steel manufacturers," Secretary Redfield said, "for it implies the construction of vessels so far as the actual members of a vessel are concerned along the same lines as those employed in structural work. Such a system of ship building would permit many ship yards which have built wooden ships in the past to be transformed into assembling yards for steel vessel construction and therefore would tend to add to the ship building capacity of the country."

"We have made progress toward a merchant marine. American shippers had the lack of one brought sharply home to them when war began. The refusal or inability of foreign shipping companies to carry our goods as the needs of our commerce required them to be carried has caused us serious losses. This is one reason why we cannot make the most of the opportunity in foreign markets which the war has in other respects presented. Now we are adding to our shipping, both steel and wood, on a scale which no nation save Great Britain has equaled. We are constructing standardized ships, and have developed a new and efficient type of auxiliary sea carrier. The large power schooners now coming into service are prob-



ably the cheapest power carriers for bulk freight. Our growing merchant marine is another new tool that we did not have before the war.

"The creation of the shipping board provides definite government support for the merchant marine and assures its use in the general interest of the commerce of the land. For the first time there will be an organization charged with the duty of so developing and administering our shipping that it shall be effective for American commerce. The government appears in this as in the tariff commission and the federal reserve board as the friend and ally, not as the foe and competitor of private interests. It keeps in mind that our commerce as a whole is greater than any part of that commerce, and that the merchant marine is charged with a supreme public interest toward the whole of American commerce, which is of greater value to the nation than its own immediate advantage or gain. Our marine ought to gain, but to gain by service and by service to the whole, not to a part."

### Urges Lake Harbors

Two resolutions touching on conditions on the Great Lakes were introduced at the recent river and harbor congress in Washington by James Bardon, of the Superior, Wis., chamber of commerce.

The meeting was the thirteenth annual convention of the congress which has as its purpose the promotion and cheapening of water transportation. The resolutions introduced by Mr. Bardon and which together with the other reports were referred to a committee which will incorporate the spirit of them in their report, follow:

"Resolved that in addition to improving rivers and harbors for commercial purposes the United States government shall also select, prepare and improve on the Great Lakes and on the ocean waters what may be termed harbors of refuge for safety along the routes of water travel and especially for naval stations where vessels of war may not only find shelter but may drill and maneuver. Such harbors to be selected where the natural conditions are most favorable and to be equipped with necessary buoys, lights, telegraph and wireless stations and connections as well as with docking and supply stations, and with approaches by land highways where conditions permit.

"On Lake Superior one or more such refuge harbors may be prepared with moderate expense in the Apostle islands, at Isle Royale, Keweenaw Point and other places eastward of said point.

"Resolved, that this convention regards with much interest and satisfac-

tion the work of the Canadian government in enlarging the capacity of the Welland canal and in its contemplated improvement of the St. Lawrence river above Montreal; and the hope is expressed that a way may be found whereby the United States government may be enabled to co-operate in this great undertaking and thereby speed the day when the Great Lakes will be opened to ocean vessels."

### Inspectors Erred

After reviewing testimony presented at the trial of Capt. George H. Banker, Cleveland, before the United States local inspectors of steam vessels at Marquette, Capt. C. H. Westcott, supervising inspector of the eighth district, held recently that the local inspectors were in error in ordering a suspension of Capt. Banker's license for ten days, from Sept. 10. The verdict followed investigation of the collision between the steamers P. A. B. WIDENER and J. E. UPSON in Hay lake May 10. Capt. W. W. Dawley was master of UPSON and Capt. Banker of WIDENER.

The decision of the local inspectors in Marquette in suspending for five months from Dec. 5 the license of Charles F. Bowen, second officer of the steamer WILLIAM NOTTINGHAM, was sustained by Capt. Westcott. The penalty was imposed following investigation of the collision between NOTTINGHAM and W. GRANT MORDEN in the fog off White Fish point July 27. Bowen, as mate, was in charge of NOTTINGHAM. In their decision the Marquette inspectors held that the licensed officer in charge of MORDEN, a Canadian ship, also was to some degree responsible for the collision by navigating at immoderate speed.

### About Life Buoys

George Uhler, United States supervising inspector general of the steamboat inspection service, has directed attention to the latest rulings of the bureau relative to life buoys on steamships, in the following circular letter:

"Owing to the fact that the requirements and specifications for the construction and inspection of ring life buoys were not issued until about May 1, 1916, and that some buoys were manufactured and shipped subsequent to the formulation of the rule governing their construction, which were not exactly in accordance with the requirements and specifications of the rule, the bureau now decides that all life buoys which were manufactured and shipped prior to July 1, 1916, may be accepted as conforming to the requirements.

"All ring buoys which have been manufactured since July 1, 1916, must be in strict accordance with the rule govern-

ing their construction, and must have been inspected by an inspector of this service, and no such buoy manufactured or shipped since July 1, 1916, will be accepted, except it meets the requirements of the rules and regulations, as incorporated in the rules now in force.

"Manufacturers of ring life buoys will notify the local inspectors of the district in which the factory is situated whenever they have ring life buoys ready for inspection, and upon the receipt of such notice an inspector will inspect and test the buoys."

### Test Occulting Mechanism

The satisfactory operation of new occulting mechanism which has been tried in this country is reported by the United States bureau of lighthouses. The outfits were manufactured at the general lighthouse depot, Tompkinsville, N. Y., and were installed on two fourth-order range lights in the fourth district. They were designed to replace the old-style "pile driver" occulting mechanisms. Each consists of a frame placed in front of the lens, carrying multiple vertical metal vanes or shutters pivoted on their vertical axes and arranged to be rotated through an angle of 90 degrees by means of connecting rods. Movement is imparted to the connecting rods through links connected to a bell crank, which in turn is operated by a cam on the operating clock. The mechanism is arranged to give an instantaneous opening and closing of the shutters.

### Government Rulings

The following is a summary of recent rulings, relating to the transportation of certain articles on steam vessels carrying passengers:

*Peterman's Discovery paste* may be transported on steamers carrying passengers, but shall not be used as stores on passenger or pleasure steamers. Inquiry presented by William Peterman, New York.

*B & W Velvet metal paste* may be transported on steamers carrying passengers, but shall not be used as stores on passenger or pleasure steamers. Inquiry presented by local inspectors, steamboat-inspection service, San Francisco.

*Shepard's Liquid Insecticide* shall not be transported on steamers carrying passengers, or used as stores on passenger or pleasure steamers. Inquiry presented by the Merchants & Miners Transportation Co., Baltimore.

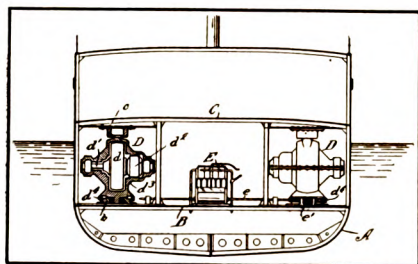
*Columbia Insecticide* (powder) may be transported on steamers carrying passengers and may be used as stores on passenger or pleasure steamers.



# How Rolling Aids Ice Breaking Ships

## Mechanically Produced Rolling Enables a Vessel to Break a Channel More Easily—Description of Haagenon Method

ICE crushers, or ice breaking vessels, are with few exceptions moderately sized, powerfully engined vessels, of the screw type. They are very strongly built with the lines at the water plane a continuous curve, and the bows bulbous or spoon shaped. Some governments, notably the Russian, have large, powerful ice breakers. One of the Russian is *ERMACK*, which develops 10,000 horsepower. She was built with four screws, three of which were aft and one forward. The forward screw has since been removed. This vessel was built by Armstrong, Whitworth & Co., on the Tyne river,



CROSS SECTION OF VESSEL'S HULL WITH GYROSCOPES INSTALLED

England, about 15 years ago, and is the largest and most powerful ice breaker in the world. The Canadian government has also powerful ice breakers.

Such vessels as these, on account of their design, the extremely heavy engines and boilers and the large space occupied by the bunker fuel, can carry no cargo. As a result, they are limited in their use to the breaking of a path for other vessels, thus making their use expensive.

On the Great Lakes are to be found ice breakers of the cargo carrying type, such as the numerous car ferries. These are large vessels, displacing loaded about 6,000 tons. They vary from 300 to 400 feet in length, between 50 and 60 feet beam and draw loaded about 15 feet of water. These vessels have about 3,000 horsepower in propelling machinery on two screws, both of which are aft, except in the case of the ferries at Mackinaw, which have one screw forward and one aft.

Ice breakers of the cargo carrying type frequently experience great difficulty through getting wedged in the ice. Cases are on record where they have been held out in the lake all winter. This difficulty arises from the fact that, since these vessels are to be used commercially, the ideal lines on which the

pure ice breaker is designed cannot be employed. Neither can the ferries be engined so heavily as an ice breaker.

It has long been believed by many vessel men that if an oscillating or rolling motion could be imparted to these vessels, their efficiency as ice breakers would be greatly increased, but the means of effecting this was not available until recently. In 1914, Capt. B. T. Haagenon, Ashtabula, O., at that time commander of the car ferry *ASH-TABULA*, invented a method of applying the oscillating principle to ice breakers. To effect the rolling moments he employed a large gyroscope, which by spinning at the rate of from 600 to 1,000 revolutions per minute and being precessed or turned by a steam engine, set up rolling moments enough to oscillate or roll the vessel to any desired degree.

An adaptation of the Haagenon invention is shown at the left. Two gyroscopes are mounted in the hull, *A*, between the decks, *B* and *C*. Each gyroscope, *D*, is composed generally of a rotor, *d*, a shaft, *d*<sup>1</sup>, and a motor, *d*<sup>2</sup>, all of which are contained within a casing, *d*<sup>3</sup>. The casing is provided at its top and bottom with suitable posts or trunnions which are journaled in stationary journal blocks, *b* and *c*, secured to the decks, *B* and *C*, of the vessel. Such ball and roller bearings as are necessary to insure perfect ease of operation of the various parts of the gyroscope are employed. The lower part of the casing, *d*<sup>3</sup>, terminates in a worm gear, *d*<sup>4</sup>.

Situated upon the deck, *B*, between the gyroscopes, *D*, is a reversible engine, *E*. The shaft, *e*, of this engine extends athwartship and has secured to each of its ends a worm, *e*<sup>1</sup>, which is adapted to mesh with the worm gear, *d*<sup>4</sup>. The angular inclination of both worms is in the same direction and both worms are of the same pitch, causing a similar precessional movement to be set up simultaneously in both gyroscopes when the engine is operated. This precessional movement of the gyroscopes causes them to impart to the vessel a reverse thrust on the opposite sides of its keel which results in an oscillating or rocking motion of the vessel. This may be accomplished by either running the engine continually in one direction, or by reversing it and causing an alternate right and left hand partial rotation of the gyroscope

casings. Another adaptation provides for the use of only one gyroscope to accomplish the same results. In order to realize the maximum influence of a single gyroscope, it is located as near the center of oscillation as possible and its spinning axis is swung at intervals corresponding to the natural periodicity of the vessel.

With the gyroscope installed, Captain Haagenon believes that any ordinary ice breaker becomes vastly more efficient. The wedging of these vessels is prevented and the continuous rolling motion eliminates also the skin friction



CARFERRY MAITLAND NO. 1  
She is Stuck in the Lake Ice, With the Crew  
Overboard Cutting Her Out.

of the vessel's sides against the ice. In addition, since the vessel is rolling as it advances, it will break the ice with one shoulder only at a time, this breaking being done by the weight of the ship applied gravitatingly against the ice mass.

To put it differently, the weight of the ship becomes a much greater factor in breaking the ice than in ordinary practice where merely the propelling force is the sole reliance of vessels of this class. This invention, Captain Haagenon points out, makes it possible to employ large cargo carrying vessels of any size for ice breaking service, provided the ships are of the full power class.

In times like the present when seaports in high latitudes are so much in use it would appear that the invention is a timely one. Its employment would aid to eliminate the troubles experienced at Archangel, Russia, the only port in Europe available to the Russians since the war began. This port is closed from November to May of each year, or for five months, resulting in greatly handicapping the military forces of the Russian Empire.

Captain Haagenon points out the

(Concluded on page 84)



# On the Coasts, Lakes and Rivers

What's Doing and Who's Doing It

## Activity Marks Winter Months on Lakes

By A. A. Eiben

CONSIDERABLE repair work is under way in Great Lakes ship yards and a number of vessels are being constructed. The steamers GEORGE W. PEAVEY and FRANK H. PEAVEY, of the Reiss Steamship Co.'s fleet are being reconstructed at the yard of the Manitowoc Ship Building Co., Manitowoc, Wis. Changes will also be made in the steamers COLLINS, HARVEY, MITCHELL, RICHARDSON, SHIRAS and McLEAN, of the Pittsburgh Steamship Co.'s fleet. The latter were taken over by the Pittsburgh company in 1916 and formerly were the Hawgood steamers E. F. HOLMES, WISCONSIN, H. B. HAWGOOD, J. M. JENKS, UMBRIA and BRANSFORD.

Local steamboat inspectors at Cleveland recently revoked the license of Capt. Edward Vosburg, of the tug FRANK W., for three months, on a charge of failing to blow proper passing signals, in connection with the collision between the steamers CORNELIUS and JOHN ERICSSON which occurred in Cleveland harbor on Oct. 26. The license of Capt. John C. Rafferty, of the tug FAIRPORT, was also suspended for three months on a similar charge. FAIRPORT towed the steamer R. R. RICHARDSON when she collided with the steamer MARQUETTE & BESSEMER No. 1 at Conneaut on Aug. 22.

Capt. R. W. England, of the steamer B. F. JONES, recently resigned as master of that vessel. Captain England has been in the Becker fleet for 17 years. He will remain ashore during the next navigation season.

The Pioneer Steamship Co., Cleveland, recently filed suit in the United States district court of Buffalo against the Lehigh Valley Coal Sales Co., Buffalo, for alleged delay in loading the steamer HAROLD B. NYE at Tift Farm last November. Damages amounting to \$3,330 are asked.

At a recent meeting of the Cleveland lodge of the Ship Masters' Association, the following officers were elected: Capt. Walter Grashaw, president; Alexander Craigie, vice president; Capt. Walter L. Girardin, second vice president; Capt. Walter Thompson, secretary, and Fred L. Leckie, treasurer. Capt. M. G. Allen was elected delegate to the grand lodge meeting and Capt. George McGarry, alternate. The grand lodge meeting of the association will be held in Cleveland late in January.

The steamers SUSQUEHANNA and SCHUYLKILL, which were recently sold

to coast interests by the Great Lakes Transit Corporation, Buffalo, will be cut in two and fitted for salt water navigation at the yard of the Buffalo Dry Dock Co. Both vessels will be ready to leave for the coast as soon as ice conditions in the spring permit. The two sections of each vessel will be rejoined at Montreal.

Capt. J. H. Andrews, formerly a resident of Painesville, O., and an old time lake navigator, died at West Palm Beach, Fla., recently. Capt. Andrews enjoyed the distinction of piloting the first ore boat to come to the lower lakes district from Lake Superior. He was 87 years old and had lived in Florida for 20 years.

The big steamer building for the Limestone Transportation Co. at the Lorain yard of the American Ship Building Co., will be named CARL D. BRADLEY.

In order to minimize as much as possible the rush which occurs during the early spring, local inspectors at Duluth-Superior have begun to inspect the vessels moored there for the winter.

At a recent meeting of the Cleveland branch of the Tug Firemen's and Linemen's Protective Association, the following officers were elected: Harry McLaughlin, president; Archie Whalen, vice president; Gust Krueger, corresponding secretary; George L. McAuley, financial secretary; James Ellsworth, Frank Miller and Thomas Hueitte, trustees.

The Canada Steamship Lines, Ltd., recently purchased the steamer FRED PABST, now at Port Huron, and will remove her engine and boilers. The machinery will be installed in a new wooden hull which is to be built for the Canada Steamship Lines at Sorel, Que.

E. L. Shipley, vice president of the Northwestern Fuel Co., died at St. Paul, Minn., Jan. 2. Mr. Shipley had been connected with the company for many years and was in charge of the lake trade.

The Great Lakes Dredge & Dock Co., Chicago, has taken over the Gillen Dredge, Dock & Construction Co. and will finish work on all contracts under way by the Gillen company. The price paid for the property was not given out.

The tugs MICHIGAN and W. L. MERCEREAU, of the Great Lakes Towing Co.'s fleet, have been chartered for the winter by the Pere Marquette railroad for ice

work. MICHIGAN is assisting car ferries in the Detroit river and MERCEREAU is stationed at Ludington, Lake Michigan.

The three steamers building for M. A. Hanna & Co. by the American Ship Building Co., will be named LOUIS W. HILL, CARMEL A. THOMPSON and WILLIAM A. AMBERG. The vessels will go into commission early in 1917.

The steamer TOURIST was recently sold by Captain E. J. Dodge, of Put-in-Bay, to the Erie Transportation Co., Erie, Pa., for \$10,500.

For the first time in the history of the Marblehead life saving station, the coast guards will be kept on duty all winter. Captain George E. Jackson, who is in charge of the station, made requisition for this service on account of the many calls from Lake Erie during the winter months from persons who are caught crossing the ice, or from the mail carriers who make daily trips to the islands.

Local steamboat inspectors at Cleveland recently conducted a thorough investigation of several accident cases. Captain Howard Geel, master of the steamer BELGIUM, and Captain E. S. Pickel, master of the steamer CITY OF ERIE, which were in collision in Cleveland harbor on Sept. 7, 1916, were exonerated from all blame for the accident. Heavy weather and the crowded condition of the harbor were held by the inspectors as the causes of the accident.

After hearing the testimony of the entire crew of the steamer MARSHALL F. BUTTERS, which foundered in Lake Erie on Oct. 20, the local inspectors at Cleveland dismissed the case. The testimony of the sailors showed that every effort was made to save the steamer and that none of the licensed officers was in any way to blame for the accident.

The license of George D. Rood, first mate of the steamer ANDASTE, recently was suspended for three months by the local inspectors at Cleveland. ANDASTE struck the breakwater at Lorain on Sept. 24, causing damage amounting to \$23,000. Capt. M. E. Bostwick, master of ANDASTE, had requested that he be notified when the steamer arrived off Lorain. The first mate was in charge of the vessel at the time of the accident and failed to notify the captain.

The steamer LUZON was recently purchased by the Morrow Steamship Co. from the Paisley Steamship Co. LUZON



will tow the barge *GEORGE HARTNELL*, also recently acquired, during 1917.

\* \* \*

Directors of the Interlake Steamship Co. recently declared the usual quarterly dividend of 2 per cent, payable Jan. 1, to stock of record Dec. 22, and also authorized the calling of the \$1,200,000 Mitchell fleet purchase money notes on Feb. 15 at the call figure of 102 and interest. There are \$1,400,000 of these notes now outstanding of an original issue of \$1,600,000, but \$200,000 of them mature Feb. 15 and will be paid at par, the maturities of later date being called for payment at the figure stated. The only remaining debt of the Interlake will be the \$2,250,000 still outstanding of the original first mortgage of \$3,000,000, which is being paid at the rate of \$250,000 annually.

## News From Boston Bay

By George S. Hudson

Fishing steamer *C. B. SANFORD* has been bought by F. L. Turner, Boston, for about \$15,000. Two-masted schooner *JULIA FRANCIS* sold to Manuel De Sousa for packet service between New Bedford, Mass., and Azores.

\* \* \*

Tug *CONFIDENCE*, owned by Boston Tow Boat Co., has been rebuilt at cost of \$20,000 by the owners. The new work includes boilers and engine.

\* \* \*

Three-mast auxiliary schooner *GEORGE B. CLUETT*, owned by Dr. Grenfell, has been sold to G. A. Jenkins for about \$35,000. *CLUETT* has been used in off-shore work and also in connection with the Grenfell missions in Labrador.

\* \* \*

Boston three-mast schooner *JENNIE S. HALL*, Captain Spaulding, has been given up for lost. Vessel was bound from Gulfport, Miss., for Port de France, Martinique.

\* \* \*

Crowell & Thurlow Steamship Co., Boston, has bought the steamer *TAM-PICO* for about \$300,000 for off-shore work. Company's steamer *PETER H. CROWELL* has been chartered at \$8.50 per ton to carry coal from Newport News, Va., to Barbadoes, B. W. I.

\* \* \*

Barkentine *JOHN S. EMERY*, Boston, received \$30 per 1,000 feet on a cargo of 481,000 feet of lumber from Boston to Buenos Aires, with prospect of return charter.

\* \* \*

S. P. Luchie, for 40 years marine observer for the Boston board of trade and chamber of commerce, died at Hingham, Mass. Mr. Luchie was 70 years old and had followed the sea since childhood.

\* \* \*

Capt. Ernest Kinney, master of British steamship *PRINCE GEORGE*, of the Eastern Steamship Corporation, has resigned and will enter the employ of the Canadian government. *PRINCE GEORGE* is in charge of Capt. Alvin Simms, transferred from steamer *BOSTON*. *BOSTON* is commanded by Capt. F. L. Crosby, youngest liner master out of Boston.

\* \* \*

Four-mast Russian bark *MARIECHEN* left Boston for Norfolk to load 3,500 tons of coal for Santos at \$15 per ton.

# Gossip From the Gulf

By H. H. Dunn

NEW ORLEANS is to have another dry dock. A permit was granted by the executive committee of the Orleans Paris levee board late in December to Doullut & Williams for the establishment of a dry dock to be located on the Algiers side of the river, just above the Canal street ferry landing. This port now has one floating dry dock.

\* \* \*

News has been received in New Orleans of the sinking of the Panama canal tug *RELANCE*, formerly *SCULLY*, of New York, in a heavy sea off the Colon breakwater at the mouth of the canal, Dec. 27. Capt. Peter Evans, San Francisco, was drowned.

\* \* \*

*BRIAR RITZ*, of France, largest sailing ship which ever entered the port of New Orleans, cleared Christmas day with a full cargo of barley for Europe.

\* \* \*

Added effort to rehabilitate the Mississippi as a great inland waterway is seen in the establishment of a new barge line between St. Paul and New Orleans, to bring flour south so cheaply that it will give New Orleans a 4-cent differential per hundred under New York. Flour-milling interests of St. Paul and Minneapolis are behind the project. Two barge lines already are in operation between New Orleans and St. Louis.

\* \* \*

The Mexican Petroleum corporation announces it will have 34 large oil tankers in its fleet within the next 18 months. They will operate between New Orleans and other gulf ports and the Mexican oil fields. Four of these are to be built by the Alabama-New Orleans Transportation Co., Violet, La., at a cost of \$1,400,000. The other 30 ships are being built in different ship yards in the United States and England. They are all of the same type, 261 feet long, 31 feet beam and 20 feet deep, with a capacity of 15,500 barrels of crude petroleum. The cost of each will be approximately \$350,000.

\* \* \*

Forty men, about one-fourth of them from New Orleans, perished when the Spanish steamer *Pio IX*, Galveston and New Orleans to Barcelona, went down during a storm off the Canary islands in December. She left New Orleans Nov. 16.

\* \* \*

Improved facilities for handling freight for inland water lines were forecast recently by Herman H. Thomas, New Orleans, at a smoker of the Contractors' and Dealers' Exchange, when he was made president of that body for the third time. Commodity warehouses, landings large enough to accommodate more vessels and larger cargoes and switch-tracks for these warehouses and landings so that freight cars can be handled to and from them from any part of the city over the Public Belt railroad, were described by W. C. Lovejoy, chairman of the New Basin canal board, along which waterway the improvements are to be placed. Indica-

tions are that the work will be started early in 1917.

\* \* \*

According to dispatches from Washington, the United States, through the house committee on claims, has announced its willingness to pay for damages to the United Fruit Co. steamer *ESPARTA*, rammed by the lighthouse tender *MAGNOLIA*, 11 years ago some miles down the river from New Orleans. Ex-President Roosevelt was on board *MAGNOLIA* at the time. The courts found the lighthouse tender at fault in the collision.

\* \* \*

Captain Sodorman and three members of the crew of the barge *Bob*, of Gulfport, Miss., reported drowned when the barge was wrecked off Point Isabel, Texas, Dec. 7, reached Matamoros, Mexico, Dec. 15, after a week in a small, open boat on the gulf. They suffered greatly from lack of water and food.

\* \* \*

Tug *MAMIE COYLE*, belonging to the fleet of the Bosso Towing Co., sank in the river at New Orleans, but was raised in 24 hours. She is a 100-ton boat.

\* \* \*

The big schooner *VOLUNTEER*, belonging to the Sea Food Canning Co., Diloxi, Miss., has disappeared with Alfred and Henry Bosarge on board. It is feared she may have been blown to sea. It is doubtful if two men can handle her in rough weather.

\* \* \*

Entry of the Chilean government into commercial business with the ports of the United States was signalized by the arrival in New Orleans of the transport *ANGAMOS*, from Valparaiso. *ANGAMOS* was laden with antimony, wolfram, nitrate of soda and copper ore. She took a return cargo of merchandise, much of it shipped from New York and Chicago through New Orleans. *VALDAVIA*, *LLANQUIHUE*, *ALMISANTE* and *VALPARAISO*, all Chilean transports, are to follow *ANGAMOS* to New Orleans.

\* \* \*

Charles Harrington, southern manager for the Hamburg-American line, surprised shippers in New Orleans in mid-December by offering to book cotton shipments to Europe at \$3.25 per hundred pounds, sailings to be contingent on the restoration of peace. Mr. Harrington announced that seven ships of the Hamburg line, now in the West Indies, would be brought to New Orleans immediately for this service, if peace negotiations were started. A number of bookings for Hamburg were made at an ocean tariff of about \$17.25 a bale.

\* \* \*

For the first time in more than a quarter century, New Orleans is enjoying direct steamship service with the ports of Venezuela via Port au Spain and Trinidad, by means of *WELLESLEY*, just put on by the Mexican Fruit & Steamship Co. *WELLESLEY* was bought only recently from the Parr-McCormick Steamship Co., San Francisco, for \$150,000, according to an announcement made by John Beninato, vice president.

# Red Hot Tips From the Trade

Pertinent Suggestions and Personal Gossip

**T**HE Diamond Power Specialty Co., Detroit, has just published, under the title of "Increasing Today's Profits", an interesting study of waste and conservation in the use of fuel. The booklet is one of a series which, in addition to discussing fuel problems, describes the soot blowers manufactured by the Diamond company.

This latest bulletin points out that power is one of the largest items of expense in most manufacturing businesses and that the cost of fuel represents, on an average, 70 per cent of the cost of power. With the cost of fuel rising, the problem of using the fuel most efficiently is constantly assuming greater importance. Of all sources of preventable waste, that of the formation of soot on the fire surfaces of the boiler is probably the most troublesome. The bulletin describes interestingly the characteristics of soot, its nature, and the limitations of hand cleaning. The following five essentials in preventing soot waste are pointed out: Frequency of cleaning; thoroughness of cleaning; availability of the cleaning system; durability of the system; and the economy of operation.

The bulletin then describes a ferro-aluminum material which was developed by the General Electric Co. The Diamond Power Specialty Co. has the sole right as lessee to the use of this material in manufacturing soot blowers and other power plant equipment. This material is said to be of great hardness and to have heat-resisting qualities 50 per cent in excess of iron and steel.

The results of tests made on boilers equipped with the company's soot blowers are presented in detail. The bulletin contains a list of users of the company's products, together with photographs of plants in which these soot blowers are used.

## Marine Glue

A booklet dealing with some essential features of the marine glue problem has been issued by L. W. Ferdinand & Co., Boston. Several different kinds of glue are described, each kind having its individual purpose. Marine glue is used extensively in backing armor plate, waterproofing packing cases and tanks, covering boats and decks with canvas, coating the exterior of battery boxes, for deck and hull seams, etc. Waterproof liquid

glue is also manufactured by the company. The proper method of applying is carefully detailed and methods for meeting various emergencies are suggested.

## Winton Gas Engines

The Winton Engine Works, Cleveland, announces that orders placed up to date exceed 30,000 brake-horsepower in the aggregate. These engines are manufactured in a range of sizes from 125-horsepower to 700-horsepower. Six cylinders are used for the smaller sizes, eight for the larger. The company is specializing on large heavy-duty engines for cargo vessels up to 4,000 tons deadweight capacity. For a ship of this size two 700-horsepower, 8-cylinder engines connected to twin screws are recommended. These engines have cylinders 12-5/16 inches in diameter by 18 inches stroke. They are of the pure diesel 4-cycle type. The 8-cylinder engine mentioned above weighs 32 tons. The engines are completely enclosed. Throughout the various stages of their manufacture the point of view and ideals of the builder of fine automobile motors have been maintained. This tends to produce a smooth operating, lasting mechanism.

## Specializing in Screw Propeller Designs

When one considers the numerous branches of engineering that enter into the construction of any modern vessel, it seems only plausible that no one engineer or staff of engineers can style themselves as experts in regard to every branch. It would, therefore, appear to be rational that companies or individuals designing modern vessels, should secure wherever possible, the advice and assistance of experts who have made a life-long study of one problem in marine engineering. For instance, it is rarely found that an individual who is an expert on steam turbines, is also an authority on naval architecture, but let us take for granted that the individual is quite an authority on these two subjects; is it not only natural that he has mastered one of them more completely than the other? Therefore, he would in all probability

be widely recognized as an expert upon this one subject, rather than upon the other.

Such is the case of the American Screw Propeller Co., Philadelphia. The experts attached to this concern have made a specialty of one vitally important element in marine engineering—the screw propeller and the estimation of power for propulsion of ships. They have aimed to master this subject completely; it is their daily occupation and study. Furthermore, they are fortunate in being able to number among their members recognized authorities on this subject. It was only after considerable close study and experimenting, that the company attained the position of being able to offer its services to the engineering world, as a modern authority on the screw propeller.

The American Screw Propeller Co. was formed one year ago, at the suggestion of several prominent American marine engineers and naval architects. Since its formation it has included among its clients a majority of the large ship yards, as well as many prominent engineers and naval architects throughout the country. This company also has designed propellers for approximately 150 vessels, a majority of which have been large steel passenger, cargo and tank ships.

## Pointers on Paint

The United States Graphite Co., Saginaw, Mich., is distributing an interesting booklet on "Graphite Paint." After pointing out the economies effected by painting in time, that is, before rust or decay has set in, the booklet discusses the necessity of using paint that is durable under both natural and artificial exposure, such as wind, rain or sun and smoke, fumes, gases or extreme temperatures. An efficient paint also will resist destructive agents, whether mechanical or chemical. The United States company employs amorphous graphite from its mines in Mexico. This pigment is highly refractory and, when pure, impervious to any exposure. In the booklet the company points out that its paint has a high covering power, that is, the ability to spread a thin but efficient coating over a large area. The company states that one gallon of its paint will effectively coat 1,000 square feet of smooth metal.



# Equipment Used Afloat and Ashore

## New Piston Valve and Ring Piston—Power Windlass Outfit

**A** BALANCED piston valve designed to eliminate both leakage and friction has been developed by the Baker Valve Co., Minneapolis, Minn. These results, it is said, are secured through the use of a patented ring combination and cage. The valve is installed without any changes to the engine. The valve has already been widely adapted for use on marine, stationary and traction engines.

The accompanying illustrations show the construction of these valves, and the methods of installing them. Owing to the difference in the designs of engines, the cages vary in shape. Each valve is made especially for the engine it is to fit. Paper impressions are taken of the valve and valve seat, thus solving the problem of obtaining exact measurements. Most engines require only a single piston valve but large marine and stationary engines often require two, three or four, as shown in Fig. 5.

The distinctive features of the Baker

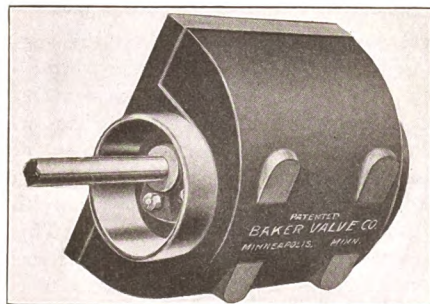


FIG. 1 — BACK OF CAGE, SHOWING LUGS WHICH AID IN HOLDING VALVE IN PLACE

valve are the cage and the ring piston. The cage is used to balance the steam pressure and the ring pistons to keep the valve vapor-tight, thus employing every pound of steam usefully. The face of the cage, shown in Fig. 3, is

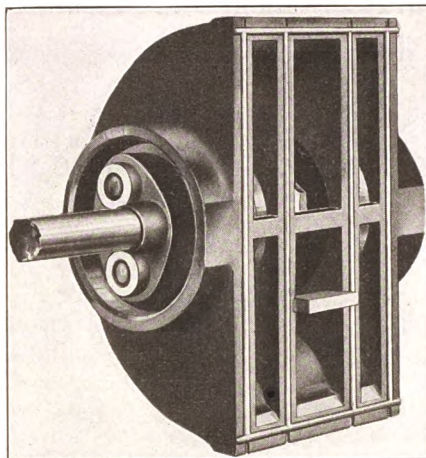


FIG. 3 — FACE OF CAGE, SHOWING ARRANGEMENT OF PACKING

made to correspond exactly with the valve seat of the engine. Lead-alloy packing wire capable of standing over 700 degrees of heat, or annealed copper wire for greater temperature, is inserted half way into the grooves between and around the ports. This packing permits the valve to be installed without any changes or machine work, as the packing will take up any wear or variation that may exist on the valve seat. Installations are thus made easily and rapidly, and the joints are said to be permanent and steam-tight.

Fig. 1 shows the back of the cage, which is equipped with lugs to meet the set screws that pass through the cover (as shown in Fig. 4) to hold the valve up to its place. A steel key is inserted in the exhaust port to keep the cage from moving endwise. By this method, the cage becomes, in effect, a stationary part of the engine that requires no attention after once properly placed. On sea-going vessels, the cages are usually bolted to the valve seat, as shown in the marine engine view, Fig. 5.

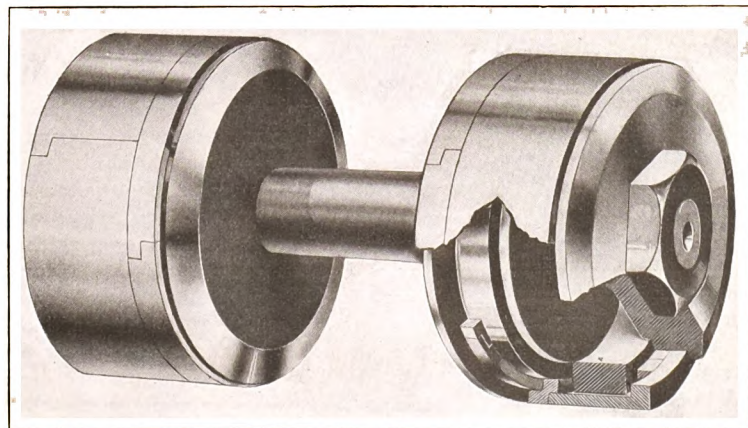


FIG. 2—PHANTOM VIEW OF RING PISTON

The cage removes the steam pressure load from the acting part of the valve as pressure can only be exerted at both ends of the cage where the piston is exposed.

Since the area of these two openings is equal, there is no resistance in either direction and the piston is consequently allowed to work freely. The valve gear and eccentric are said to get absolutely no strain.

The Baker company's specially designed ring piston is shown clearly in Fig. 2. These rings are designed to keep the piston vapor-tight and to prevent steam pressure under the rings which would cause them to expand against the walls of the valve chamber and thus cause friction. The small inner rings fit up to the shoulders of the outside rings, sealing the splits and preventing the leakage of steam. Through the use of the ring piston and cage, the steam consumption is said to be reduced and the horsepower of the engine increased. In installing these valves, no

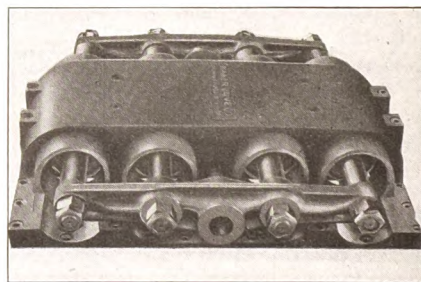


FIG. 5—LARGE MARINE ENGINES OFTEN REQUIRE FOUR PISTON VALVES

changes are made to the engine or in the events of the valve.

The Southern Transportation Co., operating a line of barges and tugs between Charleston, Philadelphia, New

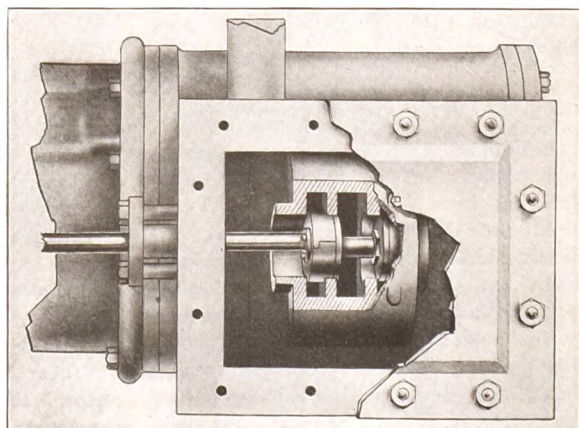
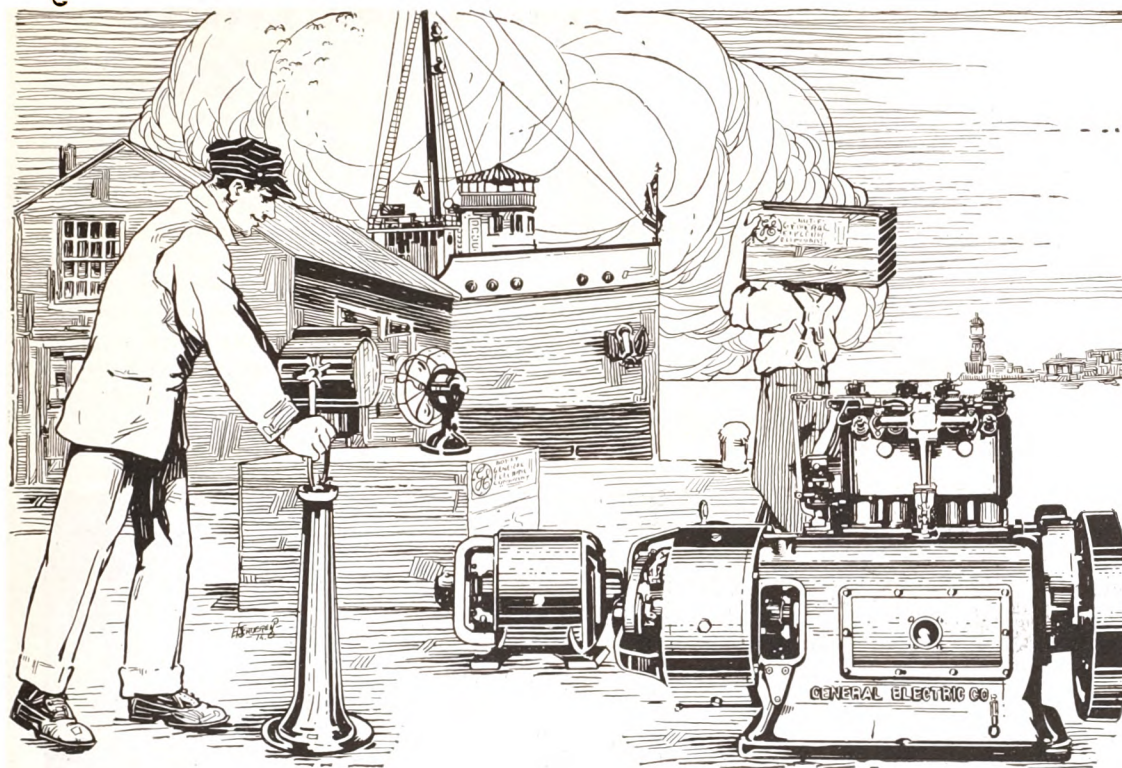


FIG. 4—PHANTOM VIEW THROUGH COVER





This  
trade-mark  
the guarantee of  
excellence on  
Goods Electrical

ADDRESS  
NEAREST OFFICE

Atlanta, Ga.  
Baltimore, Md.  
Birmingham, Ala.  
Boston, Mass.  
Buffalo, N. Y.  
Butte, Mont.  
Charleston, W. Va.  
Charlotte, N. C.  
Chattanooga, Tenn.  
Chicago, Ill.  
Cincinnati, Ohio  
Cleveland, Ohio  
Columbus, Ohio  
Dayton, Ohio  
Denver, Colo.  
Des Moines, Iowa  
Duluth, Minn.  
Elmira, N. Y.  
Erie, Pa.  
Fort Wayne, Ind.  
Hartford, Conn.  
Indianapolis, Ind.  
Jacksonville, Fla.  
Joplin, Mo.  
Kansas City, Mo.  
Knoxville, Tenn.  
Los Angeles, Cal.  
Louisville, Ky.  
Memphis, Tenn.  
Milwaukee, Wis.  
Minneapolis, Minn.  
Nashville, Tenn.  
New Haven, Conn.  
New Orleans, La.  
New York, N. Y.  
Niagara Falls, N. Y.  
Omaha, Neb.  
Philadelphia, Pa.  
Pittsburg, Pa.  
Portland, Ore.  
Providence, R. I.  
Richmond, Va.  
Rochester, N. Y.  
St. Louis, Mo.  
Salt Lake City, Utah  
San Francisco, Cal.  
Schenectady, N. Y.  
Seattle, Wash.  
Spokane, Wash.  
Springfield, Mass.  
Syracuse, N. Y.  
Toledo, Ohio  
Washington, D. C.  
Youngstown, Ohio

For MICHIGAN business refer to General Electric Company of Michigan, Detroit, Mich.

For TEXAS, OKLAHOMA and ARIZONA business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City.

For CANADIAN business refer to Canadian General Electric Company, Ltd., Toronto, Ont.

## Electrify every ship on your line

You will be surprised how much real protection and benefit electricity is on shipboard. Passengers and crew appreciate the good, bright light and the electric fans and electric heaters are a distinct advertisement for your boats.

G-E electric equipment on board ship will give the same continuous satisfactory service as the G-E generator in the big power plants ashore—they are built with the same knowledge, experience and reputation behind them.

Let our engineers assist you in selecting the right kind of electric power equipment particularly suited to your different boats.

The following are made especially for marine use:

Switchboard  
Meters and Instruments  
Wire and Cable  
Wiring Devices  
MAZDA Lamps  
Telltale Boards

Electric Bake Ovens  
and Ranges  
Electric Radiators  
Tubular and Luminous  
Searchlights—  
Incandescent and Arc

Internal Combustion  
Engine Generating Sets  
Steam Engine Generators  
Turbo Generators  
Motors

# General Electric Company

General Office: Schenectady, N. Y.

6302



York and other lines, will immediately begin the erection of a \$200,000 plant for the construction and repairing of barges, tugs and other vessels at Norfolk, Va. The new yard at Norfolk will be in addition to the ship yard the company now maintains at Chesapeake City, Md. The headquarters of the company are at Philadelphia.

### Book Review

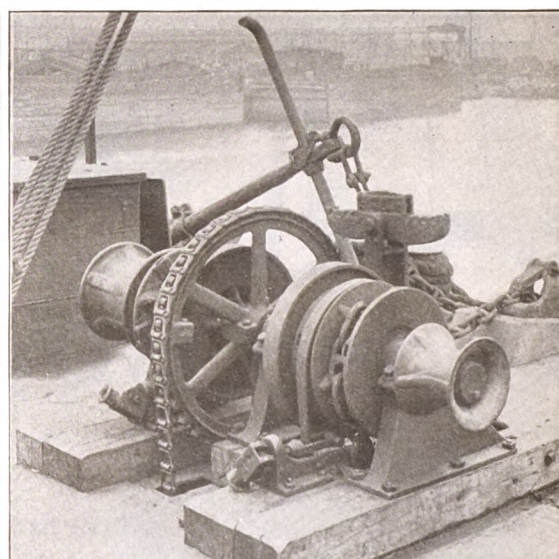
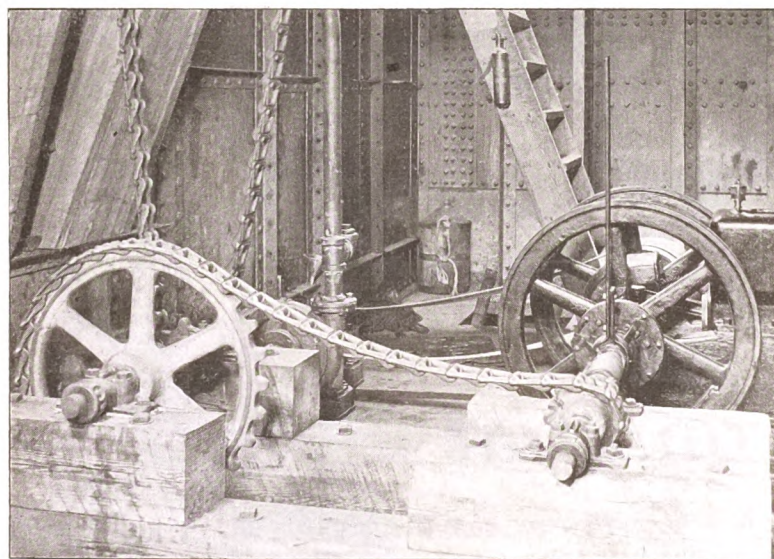
*The Naval Constructor*, by George Simpson; 820 pages, 3½ x 6 inches, cloth. Published by the D. Van Nostrand Co. and furnished by *The Marine Review* for \$5 net.

*The Naval Constructor* is a handbook covering the essentials of ship design

## Power Windlass Outfit

THE accompanying photographs show a power windlass outfit, installed on an 1,800-ton steel barge, which runs between New York City and Boston. This outfit consists of a 6-horsepower stationary engine, built by the Gray Motor Co., Detroit. The engine is equipped with a one-way clutch with a double reduction, by means of chains and sprocket. This reduction is approximately 20 to 1. The clutch was furnished by the Snow & Petrelli Mfg. Co., New Haven, Conn. The windlass is designed to lift two 1,500-pound anchors.

ation with this railroad, for a large portion of the year, the available time for navigating Hudson bay and straits at the present time being only two months (this being the recommendation of the Canadian government), while with oscillator installed this could be increased to five or six months; applied to the Great Lakes generally, it would make both cross and inter-lake navigation possible throughout the year, an immense advantage to shipping which is readily apparent; car ferries could operate continuously, thus greatly accelerating freight movements and pre-



GASOLINE POWER WINDLASS OUTFIT USED ON OCEAN-GOING BARGE

for students, naval architects, ship builders and others associated with the marine industry. The book is unusually complete and contains data concerning most of the innumerable problems met with in marine design. Formulas are given for the many computations and, in addition, many discussions of the various factors affecting ship design are included. The book contains a number of tables and data on the weights and physical properties of steel plates, channels and other structural steel used in naval construction. Tables containing physical data on timbers are also supplied. Among other valuable features contained in this book are designs for various standard parts of equipment, such as riggings, rope, fittings, gun mountings, windlasses and tackles. A number of the chapters are devoted to material concerning lifeboats, rafts, safety apparatus and rules. In addition to the information on design and customs relating to ships, considerable technical data are appended, including tables of measure, capacities of different sized tanks, unit equivalents, trigonometrical functions and other mathematical tables.

W. C. Disbrow Jr., 71 Cortlandt street, New York City, distributor for the Gray Motor Co., is planning to bring out a windlass outfit for small boats. This outfit will be composed of a 1¾-horsepower Gray stationary engine with a 16 to 1 gearing to connecting rods running through the deck and working direct to the windlass levers. A one-way clutch will be used so that the engine may be used to drive a bilge pump without having to work the windlass. It is expected that this outfit will be found useful to small boat owners, who will find it a labor-saving device.

### Ice Breaking Device

(Concluded from page 78)

following examples of how he believes his invention would be of value: It would make Montreal and Quebec as accessible for ocean shipping in winter as in summer; when the Hudson Bay railroad is completed, the successful navigation of the Hudson bay and strait will be made possible in co-oper-

venting congestion at railway terminals and exchange points.

The weight of a gyroscope with precessing engines is less than 1 per cent of the vessel's deadweight displacement. The actual size is dependent on the vessel's construction and the position of the transverse metacenter with relation to the center of gravity of the vessel.

On a vessel such as the steamer *ASH-TABULA*, which has a displacement of approximately 6,000 tons loaded and a beam of 56 feet, a 35-ton wheel would be used. This would develop rolling moments of 5,000 tons, through simple precession and without imparting any undue strain on the vessel. These moments would cause this vessel to roll about 10 degrees.

Extensive tests with gyroscopes were carried out by the United States navy on the destroyer *WORDEN* in 1913 to prove the correctness of the formulas relating thereto and to demonstrate that when properly installed, gyroscopes are perfectly safe and need but little attention.